

Biodiversity and Endemism within the Mount Canobolas Volcanic Complex

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Mt Canobolas State Conservation Area (SCA) hosts a small remnant of sub-alpine vegetation consisting of seven recognisable communities with the heathlands on the rock plates appearing to be unique to the SCA. The SCA has a known biota of 884 native species that includes 14 threatened species and at least 10 endemic taxa. Some 200 species are regionally significant, being either rare or at the limits of known geographic range. The vascular flora is particularly species-rich being considerably more diverse than nearby regional reserves and over 12 fold richer than comparable areas of the Kosciusko National Park. One of three endangered ecological communities, the Mt Canobolas *Xanthoparmelia* Lichen Community, is unique to the volcanic province.

While there is some indication the endemic lithophytic lichens, the threatened *Eucalyptus canobolensis* and the heath communities may be substrate specific, there is no strong evidence of a geological association among other flora and fauna. We postulate that the presence of multiple endemic species reflects the geographic isolation which has provided an environment for species evolution by vicariance. Alternatively, Mt Canobolas has acted as a refugium for formerly widespread species that have become extinct elsewhere.

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KEYWORDS: Central Tablelands, endemic, evolution, inselberg, refugium, sub-alpine, vicariance

INTRODUCTION

Mount Canobolas is an extinct intraplate alkaline volcano (Middlemost 1981; Sutherland 2003; 2011), provincially known as The Mount Canobolas Volcanic Complex (MCVC). Extensive eruptions in probably three main episodes occurred over ± 1 million years in the Middle to Early/Late Miocene, between 13 to 11 mya (Branagan and Packham 2000). Mt Canobolas is the southernmost and youngest central volcano on the Bunya Mountains to Canobolas hotspot track (Sutherland 2003; Davies et al. 2015), also known as the Inland Hotspot Track, which includes the Nandewar Volcanic Suite and Mt Kaputar, and the Warrumbungle Ranges. Each central volcano in this chain formed tall isolated cone-shaped mountains that rose up to 2,500 m above the surrounds with lava spreading up to 80 kilometres from the source. The MCVC initially produced large outpourings of basic lava, of mainly hawaiitic composition, which radiated across the landscape. Subsequent eruptions

of felsic domes and copious amounts of pyroclastic material coincided with the extrusion of more mafic trachyte kindred lavas, which comprise the volcanic pile of domical landforms in the central core (Middlemost 1981). The evidence of interlaced lavas and associated ash of various eruptions provides a complex heterogeneous matrix within the central core area, which Middlemost (1981) contends is difficult to unravel because rocks from different events are juxtaposed by volcanic subsidence.

Before the Miocene volcanism the ancient geologies, particularly of the Lachlan Fold Belt which is provincial to the Central West (CW) of NSW, underwent major tectonic events from the Silurian to Early Carboniferous epochs (Foster and Gray 2000). It remains unclear if broad uplift which occurred during these orogenic events gave rise to the eastern highlands or if they are remnants of an even older orogenic mountain range (Branagan and Packham 2000). In any event, there has been significant erosion of both the central volcanoes and adjoining highlands

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over the last 10 to 25 million years. As a consequence, the volcanic provinces along the chain have decreased in size and altitude, and increased in isolation from each other, with resultant fragmentation into pockets of alpine and sub-alpine areas on high peaks. Mt Canobolas being the youngest and smallest volcano is now the most intact, prominently protruding as a 'landlocked island' up to half a kilometre above the surrounding plateau of the western Central Tablelands (CT). Mt Canobolas ranges in altitude from c. 900 m to 1,397 m at the summit with several peaks, steep valleys and waterfalls (NPWS 2003a). It is surrounded by highlands having variable relief of up to 1,000 m altitude of the extensive CT plateau but dips away to the west into the Central Western Slopes (CWS). The boundary between the CT and CWS is an undulating series of erosional step-down scarps.

Situated on the western boundary of the CT, the MCVC is separated from coastal drainage by the Great Divide (GD), c. 120 km to the east. The western CT can be regarded as a western trending spur of the GD. The so-called Canobolas Divide is a north-west trending range and passes through the centre of the MCVC, forming the watershed dividing the inland drainage of the northern Macquarie-Darling River system from the southern Lachlan River system (Chan 2003). The different constructional landforms that have evolved from the tempestuous geological past have given rise to polymorphic drainage patterns and microclimates around the mountain. The high altitudes dictate a climate of the mountain's own making and the geology provides a geodiversity not found elsewhere in the region (Branagan and Packham 2000). Also, Mt Canobolas supports a significant isolated remnant of vegetation with montane and sub-alpine affinities; the only such area of this ecosystem on the western CT. Much of the high altitude remnant vegetation is contained within the Mt Canobolas State Conservation Area (SCA) covering an area of 1,672 ha (NPWS 2003a) which is situated within the South Eastern Highlands Bioregion in the Interim Biogeographic Regionalisation for Australia (IBRA) sub-region of Orange (NPWS 2003b).

Mt Canobolas shares many characteristics with Mt Kaputar. Both were produced by the same magma source on the Inland Hotspot Track with Mt Kaputar arising some seven million years earlier. Like Mt Canobolas, the summit of Mt Kaputar supports remnant montane and sub-alpine plant communities that are isolated by large distances from other occurrences of these vegetation types on the Northern Tablelands along the GD to the east. The biota of Mt Kaputar includes some 18 species (8 plants and 10 invertebrates, mainly molluscs) considered to be

endemic to the mountain (OEH 2018a; Murphy and Shea 2015). Given the similar geology, geographical isolation, high altitudes, and remnant montane and sub-alpine vegetation, it seems plausible that Mt Canobolas may similarly host a range of unique endemic life forms.

However, there has been no comprehensive documentation of the biodiversity of the MCVC, with knowledge of the mountain's biota confined to a limited number of scientific publications and records of opportunistic specimen collections in various institutional and national databases. Accordingly, the biodiversity of Mt Canobolas is poorly known and its scientific significance and conservation value has not been widely appreciated.

The purpose of this paper is to compile for the first time a record of the biodiversity of the Mt Canobolas SCA which covers the core of the MCVC. Emphasis is given to identifying the endemic species and discussing the importance of the area for speciation by vicariance and as a refugium for montane and sub-alpine taxa. The possibility of rare species being linked to a previously more coherent volcanic continuum, allowing the movement of biota along it, is also considered.

MATERIALS AND METHODS

Species lists, arranged by family, of the main components of biodiversity known for the SCA have been compiled mainly from literature sources and the Atlas of Living Australia database (ALA 2018). For plants, recordings were compiled from the Australasian Virtual Herbarium (AVH 2018) as these are based on specimen records held in herbaria, as well as from the literature (Hunter 2002), personal observations by the authors and other recent surveys (M. Porteners pers. comm.). Fungi and invertebrate records from the Biosecurity Collections Unit, NSW Department of Primary Industries at Orange, have been included.

Records of endemics and threatened species were extracted from these data lists. The distribution of each plant and fungal species was examined in the AVH/ALA distribution maps to determine core range limits, with outliers that occur distant to the MCVC noted. Data for vascular plant species occurring in 22 other conservation reserves located within the near CW have also been extracted from BioNet (2018a) to use comparatively. Physiographic data from individual reserve Plans of Management and other sources have also been compiled for each of the reserves. The near CW is defined as within c. 150 km west of the GD Range summit. Most of these reserves

are situated within or in close proximity to the CT Botanical Subdivision (Anderson 1961). The western portions of the large Wollemi and Blue Mountain NPs falling within the CT have not been considered.

No published vegetation classification currently exists for the CT west of the Blue Mountains. The only classification available for this area is the online BioNet Vegetation Classification (BVC) (OEH 2018b) which is derived from cluster analysis of data from multiple surveys conducted by government and consultant botanists. The survey data is published and accessible online in the BioNet Vegetation Classification application (OEH 2018b). The output vegetation associations (Plant Community Types [PCT]) are vetted by the Plant Community Type Change Control Panel to ensure its reliability and robustness (OEH 2018b). The BVC supports a state-wide environmental assessment regulatory regime.

For this study, montane and sub-alpine vegetation communities described by Hunter (2002) in the Mt Canobolas SCA were compared with PCTs currently recognised in similar habitats on the Great Dividing Range over 100 km to the east (BioNet 2018b). BioNet (2018b) assigns PCTs to threatened ecological communities (TEC) and the conformity of the relevant PCT on the mountain to each TEC was checked against the community description in the Final Determination (Scientific Committee 2018).

Comments on data accuracy, points of interest about species and threatened communities are provided.

RESULTS AND DISCUSSION

The SCA occupies the core of the MCVC consisting predominately of trachyte kindred rocks and encompasses the high altitude components of the primary ecosystem remnants. Few orders or classes of biota have been systematically surveyed by specialists on Mt Canobolas and much of the data available has not been formally published. Consequently, substantial listings of species have been published only for the bryophytes (Downing et al. 2002) and vascular plants (Hunter 2002). Other non-commissioned surveys of lichens, birds, reptiles, amphibians and mammals have also been undertaken with results recorded only in online databases. The currently known native biota of the SCA consists of 884 species, however systematic surveys have not occurred for many groups so the figure is likely to underestimate the overall numbers. Current knowledge of each major grouping is summarised below. Reference is also made to some of the most

important publications for Mt Canobolas relating to taxonomic works describing new species endemic to the mountain.

Vegetation Communities

Hunter (2000; 2002) defined seven vegetation communities within the SCA (Fig. 1). The significance of these is discussed in relation to similar high altitude vegetation types on the GD to the east (Table 1). One Endangered Ecological Community (EEC) and one Critically Endangered Ecological Community (CEEC) are represented.

Community 1. Stringybark–Peppermint Shrubby Open Forests and Woodlands

Covering around 26% of the SCA in areas above 1000 m altitude, this community is characterised by predominantly *Eucalyptus macrorhyncha* and *E. dives*, in association with *E. canobolensis*, *E. pauciflora*, *E. dalrympleana* subsp. *dalrympleana*, *Acacia dealbata*, *A. melanoxylon* and *Exocarpos cupressiformis*. It has a well-developed shrub layer and ground cover of herbs and grasses. Hunter (2002) states the occurrence within the SCA is significant due to the unusual assortment of associated species, and the community is at its north western geographic limit of occurrence. Hunter's observation that this community, which principally occurs on upper slopes and ridgetops around the peripheral areas of the SCA (Fig. 1), has an unusual assemblage of tree species is pertinent. There are no PCTs in the BioNet Vegetation Classification database (BioNet 2018b) that closely match it. Most recognised PCTs dominated by *E. macrorhyncha* and *E. dives* occur in drier environments than on Mt Canobolas as reflected in their understory shrubs and grasses. The closest PCT in BioNet (2018b) is PCT 730, which does not include *E. canobolensis* as a dominant.

Communities 2 and 4. Outcrop Heaths and Shrublands / Outcrop Low Open Woodlands

These two closely similar communities (Table 1) are found on skeletal soils on rock outcrops. Together they occupy some 6% of the SCA, occurring as small highly disjunct patches throughout (Fig. 1). The main difference between the two is that Community 2 lacks trees. Community 4 may have scattered trees of *E. canobolensis*, *E. bridgestana* and *A. dealbata*. In both communities the shrubs are scattered and depauperate, although sometimes forming dense thickets, and occur in association with cryptogams, scattered herbs and grasses. These rock outcrops contain the endangered Mt Canobolas *Xanthoparmelia* lichen community.

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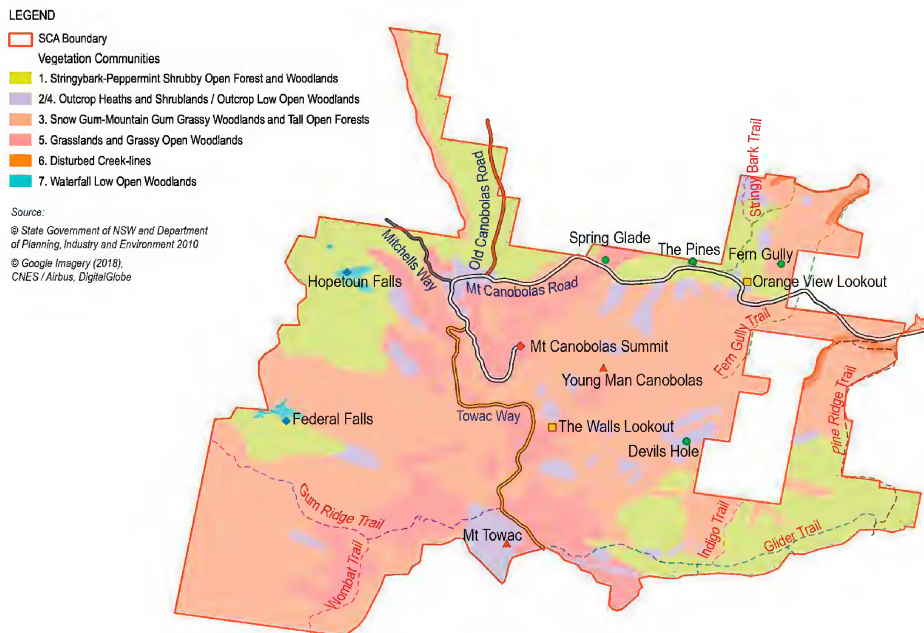


Figure 1. Vegetation communities occurring within the Mt Canobolas State Conservation Area (after Hunter 2002).

Hunter (2002) considers these communities to be restricted to the SCA and unique. No floristically similar heathlands are recognised as PCTs in the BioNet Vegetation Classification (BioNet 2018b).

Community 3. Snow Gum-Mountain Gum Grassy Woodland and Tall Open Forest

This community occupies some 52% of the SCA (Fig. 1) and occurs above 900 m altitude. It is characterised by predominantly *E. pauciflora*, *E. dalrympleana* subsp. *dalrympleana*, and *E. canobolensis* in association with *E. dives*, *E. macrorhyncha*, *E. viminalis* and *A. dealbata*. It has a well-developed layer of low and tall shrubs and a dense ground layer of 80 to 100% cover of climbers and trailers, herbs and grasses. PCT 1197 is closest to community 3 (Table 1).

Community 5. Grasslands and Grassy Open Woodlands

Trees are a minor component of this community which occurs above 1200 m altitude and occupies around 15% of the SCA area (Fig. 1). It is characterised by low densities of *E. pauciflora*, *E. canobolensis*, *E. dalrympleana* subsp. *dalrympleana*, *A. dealbata* and

A. melanoxylon. The shrub layer is of low stature and sparse or absent whereas the ground layer of twiners, herbs and grasses is well developed. This assemblage is most similar to PCT 1197 in the BioNet Vegetation Classification (BioNet 2018b) (Table 1).

Community 6. Disturbed Creek-lines

Occupying about 1% of its area this community occurs in the north eastern lower reaches of the SCA (Fig. 1). It is characterised by tall open stands of *E. viminalis*, *E. stellulata*, *E. pauciflora*, *E. dalrympleana* subsp. *dalrympleana* and *A. melanoxylon* with a scattered to dense shrub layer, ferns and herbs. This assemblage is most similar to PCT 1191 that is dominated by *E. viminalis*, *E. pauciflora*, *E. rubida* and *E. stellulata* (BioNet 2018b). Within the SCA, *E. rubida* (Candlebark) is replaced by the threatened *E. canobolensis* (Silver-leaf Candlebark).

Community 7. Waterfall Low Open Woodlands

This community is restricted to locations at Federal and Hopetoun Falls, occupying less than 1% of the SCA (Fig. 1). It is an open shrubland community with occasional stunted trees of *Eucalyptus goniocalyx*, *E. canobolensis* and *A. melanoxylon*

Table 1. Vegetation Communities in the Mt. Canobolas State Conservation Area.

| Hunter (2002) | Dominant Eucalypts and/or shrubs | Nearest PCT ¹ | EEC ² | Comment |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Stringybark – Peppermint Shrubby Open Forests and Woodlands | <i>E. macrorhyncha</i> , <i>E. canobolensis</i> , <i>E. dives</i> , <i>E. dalrympleana</i> | 730. Broad-leaved Peppermint - Mountain Gum dry open forest of the Central Tablelands area of the South Eastern Highlands Bioregion | Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions | Although PCT 730 is closest to community 1, it is a dry forest type with sparser grass cover than the moist community on Mt. Canobolas. |
| 2. Outcrop Heaths and Shrublands | <i>Mirbelia oxylobioides</i> , <i>Calytrix tetragona</i> , <i>Kunzea parvifolia</i> , <i>Phebalium</i> sp. | N/A | - | No currently listed PCTs resemble this community. |
| 3. Snow Gum – Mountain Gum Grassy Woodlands and Tall Open Forests | <i>E. pauciflora</i> , <i>E. dalrympleana</i> | 1197. Snow Gum – Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion | Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions | This community occurs on similar sites to community 2, albeit with slightly more soil and scattered tree cover. No currently listed PCTs resemble this community. |
| 4. Outcrop Low Open Woodlands | <i>E. canobolensis</i> , <i>E. bridgesiana</i> / <i>Mirbelia oxylobioides</i> , <i>Calytrix tetragona</i> , <i>Phebalium</i> sp. | N/A | - | |
| 5. Grasslands and Grassy Open Woodlands | <i>E. pauciflora</i> , <i>E. canobolensis</i> , <i>E. dalrympleana</i> | 1197. Snow Gum – Mountain Gum tussock grass-herb forest of the South Eastern Highlands Bioregion | Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions | |
| 6. Disturbed Creek-lines | <i>E. viminalis</i> , <i>E. stellulata</i> , <i>E. pauciflora</i> | 1191. Snow Gum – Candlebark woodland on broad valley flats of the tablelands and slopes, South Eastern Highlands Bioregion | - | This community is similar to the Monaro Tablelands Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion CEEC ³ . |
| 7. Waterfall Low Open Woodlands | Minor <i>E. goniocalyx</i> , <i>E. canobolensis</i> | N/A | - | A minor community related to communities 2 and 4. |

¹PCT = Plant Community Type (OEH 2018b)

²EEC = Endangered Ecological Community listed under the *Biodiversity Conservation Act 2016*.

³CEEC = Critically Endangered Ecological Community listed under the *Biodiversity Conservation Act 2016*.

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in shallow soils around the falls' margins and often with taller *E. viminalis* near the base of the falls. This community is of very limited extent and it is doubtful that it deserves recognition as an entity distinct from the surrounding vegetation (Table 1).

Communities 1, 3 and 5 conform to the *Tableland Basalt Forest in the Sydney Basin and South Eastern Highlands Bioregions Endangered Ecological Community*. This EEC is generally a tall montane forest dominated by *Eucalyptus dalrympleana* (Mountain Gum) and *E. pauciflora* (Snow Gum) (Scientific Committee 2008). It is known to occur between 600 and 900 m altitude on the eastern parts of the CT. On Mt Canobolas, Tableland Basalt Forests occur extensively as tall open forests in valleys and on ridges in deep volcanic soils above 900 m altitude, hence representing a high altitude variant of the EEC on the western CT.

Community 6 closely resembles the newly recognised *Monaro Tableland Cool Temperate Grassy Woodland in the South Eastern Highlands Bioregion Critically Endangered Ecological Community*, which is predicted by the NSW Office of Environment and Heritage (OEH) to occur in the Orange district (OEH 2019a).

Bryophytes

Bryophytes include mosses, liverworts and hornworts. They are often referred to as 'lower plants' and form an important component of the vegetation but are regularly overlooked in biological surveys.

A rich and diverse mix of 79 species of bryophytes is recorded for Mt Canobolas in 29 families and 51 genera (Table 2), mostly from an initial survey by Downing et al. (2002).

Although no endemic bryophyte species are recorded, the assemblage includes an unusual mix of alpine, arid zone and rainforest species, with 6 species being at their northern range limits and 7 at their westernmost range. Exposed rock platforms with seepage areas on the upper flanks of the mountain are particularly species-rich. The geology of the area is complex and Downing et al. (2002) considered the presence of certain species at particular locations is probably determined by the chemical composition of the substrate rock, although clear patterns could not be discerned. Downing et al. (2002) gave an example of a curious combination of two opposed species growing together: *Encalypta vulgaris*, a calcicole (i.e. a species found only on calcareous substrates) and *Campylopus introflexus*, a calcifuge (i.e. a species never found growing on calcareous substrates). Around the summit some rare alpine species previously known only from Yarrangobilly

Caves in the Alps and Kosciuszko National Park occurred together with species from the arid zones to the west. Elsewhere in the SCA in a cool moist and shady gully habitat a thallose epiphytic liverwort occurred; a species usually associated with rainforest gullies of the coast and coastal ranges to the east. Other rare and uncommon mosses, liverworts and hornworts are highlighted in their manuscript. It is unclear if the disjunct and rare species consisting of contiguous arid zone, alpine and rainforest specialists are stranded relics from past climatic ages or whether such species have arrived through superior long-distance dispersal abilities.

Downing et al. (2002) also noted several rare and uncommon species occurred on roadside banks, walking trail margins, fallen logs, on rough basal bark of eucalypts and exposed rocks in the grassy woodlands, which elsewhere in NSW are usually devoid of bryophytes. The bryoflora of the nearby Towac Pinnacle outcrop, to the east of the SCA, was found to include a few species that were either not recorded or uncommon within the SCA, indicating that other species may well occur on the many volcanic outcrops, dykes, domes and plugs comprising the MCV. C.

Vascular plants

Vascular plants constitute the largest component of the currently known biota within the SCA. Some 14 fern, 138 monocotyledon and 262 dicotyledon species are present (Table 2). The diversity spans 78 families and 228 genera (Appendix 1). Almost half of the 416 vascular plants are assigned to just 6 superfamilies, namely Asteraceae (47), Cyperaceae (18), Fabaceae (35), Myrtaceae (14), Orchidaceae (40) and Poaceae (47). A number of the species listed by Hunter (2002) cannot be substantiated and so have been excluded from the compilation.

Approximately 60% of the vascular flora species occurring in the SCA can be considered generalists in the sense that they have widespread distribution and display plasticity in being adaptable to a wide range of edaphic, climatic and other environmental variables. As Hunter (2000) observed, these species are generally the most common ones and are found in most of the communities. The remaining flora exhibits varying degrees of specialisation from narrow endemic species to regionally significant species.

Among the plants are at least five endemic species: *Prostanthera gilesii* (Conn and Wilson 2015), *Eucalyptus canobolensis* (Hunter 1998), *Bulbine* sp. (J. Bruhl pers. comm.), *Caladenia* sp. aff. *patersonii* and *Prasophyllum* sp. aff. *odoratum* (D. Jones pers. comm.). Other taxa, including the herb

Table 2. Summary of known biodiversity within the Mt Canobolas State Conservation Area.

| Biodiversity | Families | Genera | Native species | Exotic species | Endemic species | Regionally significant species | EEC ¹ | TS ² |
|------------------------|------------|------------|----------------|----------------|-----------------|--------------------------------|------------------|-----------------|
| Vegetation communities | | | | | | | 2 | |
| Bryophytes | 29 | 51 | 79 | | | 13 | | |
| Gymnosperms | 2 | 2 | 1 | 1 | | | | |
| Ferns and Allies | 6 | 11 | 14 | | | 5 | | |
| Monocotyledons | 12 | 61 | 121 | 17 | 3+ | 39 | | |
| Dicotyledons | 58 | 154 | 192 | 70 | 2+ | 76 | | 2 |
| Fungi | 28 | 47 | 102 | 1 | 4 | 46 | 1 | |
| Mammals | 19 | 30 | 29 | 9 | | 5 | | 5 |
| Birds | 35 | 69 | 97 | 2 | | | | 7 |
| Amphibians | 3 | 4 | 5 | | | | | |
| Reptiles | 4 | 15 | 20 | | | 5 | | |
| Fish | 1 | 1 | 1 | | | | | |
| Molluscs | 6 | 10 | 10 | 2 | ? | 8 | | |
| Insects | 81 | 154 | 210+ | | ? | | | |
| Velvet worms | 1 | 1 | 1 | | 1 | 1 | | |
| Flat worms | 1 | 2 | 2 | | ? | 2 | | |
| TOTAL | 286 | 612 | 884+ | 102 | 10+ | 200 | 3 | 14 |

¹Endangered Ecological Communities listed under the *Biodiversity Conservation Act 2016*.

²Threatened Species listed under the *Biodiversity Conservation Act 2016* and/or *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*

Craspedia sp. aff. *lamicola* and shrubs in the genera *Asterolasia*, *Melichrus* and *Phebalium* are likely also to be endemics (I. Telford and J. Bruhl pers. comm.), along with two recently found orchids *Diuris* sp. aff. *chryseopsis* and *Dipodium* sp. aff. *atropurpureum* (Bower 2019).

Two of the endemic plants *P. gilesii* and *E. canobolensis* are listed as threatened (Table 2). The shrub *P. gilesii* (formerly *P. sp. C*) (Giles' Mintbush) is only known from two small colonies and is listed as Critically Endangered under the BC Act 2016 (Scientific Committee 2017). *E. canobolensis* (syn. *E. rubida* subsp. *canobolensis*) (Silver-leaf Candlebark) occurs throughout the SCA and is endemic to the MCVC. Its stronghold is above 1,000 m altitude within the SCA but it occurs sporadically down to ± 900 m altitude on the slopes surrounding the mountain. With a propensity to form hollows, the

species provides valuable nesting and roosting habitat as well as copious manna exudate as a food source for arboreal mammals and birds. It is listed as Vulnerable under the BC Act and Endangered under the EPBC Act (Department of the Environment 2008).

The sub-alpine forests and woodlands support 11 eucalypt species as canopy dominants and a broad array of understory shrubs, forbs and grasses, totalling 416 species. Approximately 120 of these can be considered as regionally significant because of their rarity or because they are at their geographical range limits within the CT. By comparison, 475 plant species occur in an area of almost 23,000 ha of montane forests occurring between 1,000 and 1,400 m altitude within Kosciuszko National Park (Doherty et al. 2015). The richness of the flora of the SCA is over 12 fold that of Kosciuszko NP, being almost 260 species per 1,000 ha compared with 20.6

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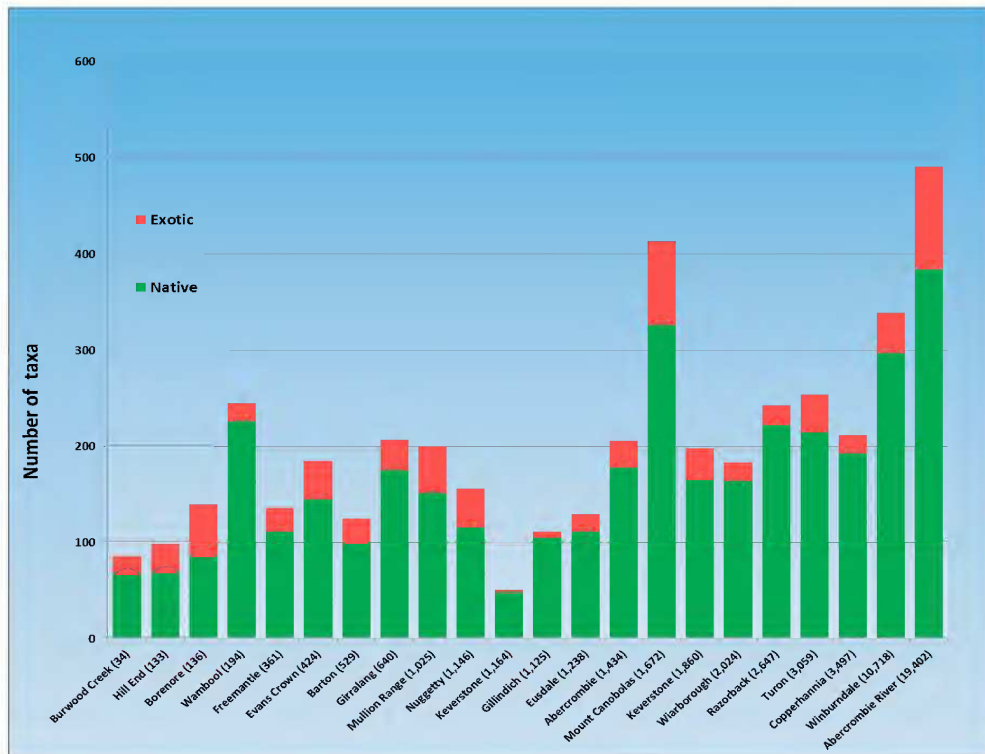


Figure 2. Number of native and exotic vascular plant species recorded for 22 conservation reserves (arranged by increasing area) in the near (eastern) Central West of NSW. Numbers in parentheses following reserve names indicated the area (ha) of each. Data from Bionet (2018a, see Appendix 2).

species per 1,000 ha respectively. Compositionally there are also differences in the floras with the ratio of dicotyledons to monocotyledons being lower in the SCA with 1.6:1 compared with 2.8:1 in Kosciuszko NP. No endemic species occur in the montane forests of Kosciuszko NP and 105 species, which are either disjunct or occurring at their geographic range limits is proportionally much lower than the 120 species for the SCA. In both reserves however, the dicotyledons were similarly dominated by taxa in the Asteraceae, Fabaceae and Myrtaceae and monocotyledons by Cyperaceae, Orchidaceae and Poaceae.

A rich and eclectic suite of 40 terrestrial orchid species occurs within the SCA (Appendix 1). A number of these orchids are unnamed and currently subject to further examination. At least one of these, *Prasophyllum* sp. aff. *odoratum*, recorded after a summer fire in 1982 and again in 2018, is considered to be a fire ephemeral (Bower 2019). Twenty-one orchid species are rare, confined to or at their geographic range limits in the SCA (Appendix 1). The SCA ranks among the most diverse areas for orchids

in the near CW along with the Calula Range north of Orange where some 60 species occur (C. Bower pers. obs.), Wambool NR with at least 47 species and Abercrombie Karst Conservation Reserve with 30 or more species (Bionet 2018a). Terrestrial Orchids are intrinsically important as bioindicators of ecosystem health (Swarts and Dixon 2009) so the presence of such a large species diversity is indicative of the stability and resilience of the ecosystems in the SCA.

Most conservation reserves in the near CW are < 2,000 ha in area and have been gazetted since the late 1960s (Appendix 2). The recorded diversity of the vascular flora generally is < 250 species for these reserves (Fig. 2). Mt Canobolas SCA stands out with 416 species, only being surpassed by 491 taxa within Abercrombie Rivers NP, which is almost 12 times larger in area. All of these reserves have been utilised since European settlement, mainly for grazing and or forestry, and in many cases for mining activities. Mt Canobolas had grazing leases in place until about the 1950s before being reserved for conservation and eventually gazetted in 1997. This, together with

the SCA's high perimeter to area ratio, rich volcanic soils and being surrounded by cleared and developed silvicultural, agricultural and horticultural lands, has facilitated invasion by exotic species. Twenty-one percent of the vascular flora is exotic, somewhat higher than the mean of 17.2 % for the comparable reserves in the near CW (Appendix 2). In Kosciuszko NP, which also has a history of post-European land use, exotic species contribute 23% of the flora (Doherty et al. 2015) which is higher than for most of the near CW reserves, including the SCA (Appendix 2).

Fungi

No published account of fungi exists for Mt Canobolas, but extensive lichen records (ALA 2018) are known from field work within the SCA, especially by JA Elix of the Australian National University and his colleagues.

Ascomycota fungi records, mainly lichens, show a great diversity among the > 90 species growing on logs, tree trunks, branches, soil and rocky outcrops or platforms in the SCA (Appendix 3). Together with Basidiomycetes, these occur in some 28 families and 47 genera (Table 2). Four lichens, *Gyalideopsis halocarpa*, *Sarcogyne sekikaica* (McCarthy and Elix 2014), *Megalaria montana* (McCarthy and Elix 2016) and *Xanthoparmelia metastrigosa* (Scientific Committee 2001) are endemic to the SCA. One particular assemblage of at least nine species of foliose lichens, including the endemic *X. metastrigosa*, is listed as an Endangered Ecological Community; the only lichen community in Australia with such legal protection. It has been recognised as unique to the SCA, and gazetted as the *Mt Canobolas Xanthoparmelia Lichen Community Endangered Ecological Community* (Scientific Committee 2001).

The assemblage consists of *Cladia fuliginosa*, *Xanthoparmelia canobolasensis*, *X. digitiformis*, *X. metaclystoides*, *X. metastrigosa*, *X. multipartita*, *X. neorimalis* and *X. sulcifera*. It occurs mainly above 1,100 m altitude on rock faces and soils unique to the MCVC. *Xanthoparmelia metastrigosa* is endemic to Mt Canobolas and *X. canobolasensis* is known only from Mt Canobolas and one locality in Tasmania while *X. sulcifera* and *C. fuliginosa* are each known from a limited number of other localities within NSW.

Some 46 species of fungi are regionally significant as they are rare or at their natural geographical range limits. Opportunistic observations of Basidiomycota fungi have resulted in the recording of eight species, which is considered particularly depauperate and dedicated study will undoubtedly identify many additional taxa.

Vertebrates

Knowledge of the vertebrate fauna of the SCA is predominantly from opportunistic records as few systematic surveys have been undertaken and there are no published accounts. The array of 163 vertebrate species in 62 families and 119 genera involves mainly generalist species with no recorded endemics, but does include 12 threatened species (Table 2) that have undergone population decline principally through loss of habitat.

Twenty nine native mammal species have been recorded, five of which are threatened species (Table 3). The mammals include six species of gliders and possums, two species of marsupial mice, four macropods, the *Tachyglossus aculeatus* (Short-beaked Echidna) and *Vombatus ursinus* (Bare-nosed Wombat) (Appendix 4). Most species have widespread distributions, but five have geographic range limits in the SCA. *Miniopterus schreibersii oceanensis* (Eastern Bent-wing Bat), *Petauroides volans* (Greater Glider), *Petaurus australis* (Yellow-bellied Glider) and *Antechinus stuartii* (Brown Antechinus) occur at their western limits whilst *Antechinus agilis* (Agile Antechinus) occurs at its northernmost limit. Presence of the Agile Antechinus has been verified by molecular evidence (A. Kerle pers. comm.) but confirmation of both the Brown Antechinus and Yellow-bellied Glider is required as there have been no recent sightings of either. A camera trap record of *Rattus fuscipes* (Southern Bush Rat) has yet to be verified by live trapping (S. Woodhall pers. comm.). Indicative of the richness of the habitat of the SCA is the diversity of 11 micro bats recorded on the mountain, including three threatened species (Table 3). Nine exotic mammal species also have been recorded, namely Dog, Goat, Horse, House Mouse, Pig, Rabbit, Red Fox, Red Deer and Ship Rat.

Avifauna recorded within the SCA includes 97 native and two exotic species across 35 families and 69 genera (Table 2) from mostly opportunistic observations (Appendix 4). All are widespread species with many being permanent residents; others are migratory. Seven species recorded in the SCA are listed as Vulnerable (Table 3) and are relatively widespread species that have suffered significant population declines since European settlement. Mt Canobolas is important as one place in the highly developed landscape that still provides refuge to these species. Other species use particular niche habitats in the SCA. *Falco peregrinus* (Peregrine Falcon) uses cliff habitats around Federal Falls for nesting and hunting. The mountainous terrain attracts raptors such as *Aquila audax* (Wedge-tail Eagle) which is commonly observed hunting and soaring on thermals as well as,

Table 3. Threatened plant and animal species within the Mt Canobolas State Conservation Area. V = Vulnerable listing, E = Endangered listing and CE = Critically Endangered listing under Threatened Species Acts.

| | Family Name | Scientific Name | Common Name | Conservation | | Remarks and Reference |
|----------------|------------------|------------------------------------------------------------|--------------------------------|---------------------|-----------------------|----------------------------------------------------------------|
| | | | | BC Act ¹ | EPBC Act ² | |
| Plants | Lamiaceae | <i>Prostanthera gilesii</i> | Giles' Mintbush | CE | | Endemic. Only two small disjunct colonies known; (OEH 2019b) |
| | Myrtaceae | <i>Eucalyptus canobolensis</i> | Silver-leaf Candlebark | V | E | Endemic. Common throughout SCA; (OEH 2019c) |
| Mammals | Emballonuridae | <i>Saccolaimus flaviventris</i> | Yellow-bellied Sheath-tail Bat | V | | Recorded 2004; (OEH 2017a). |
| | Miniopteridae | <i>Miniopterus schreibersii</i> infrasp. <i>oceanensis</i> | Eastern Bent-wing Bat | V | | Recorded 2004; (OEH 2019d). |
| | Petauridae | <i>Petaurus australis</i> | Yellow-bellied Glider | V | | No recent sighting records; (OEH 2017b). |
| | Petauridae | <i>Petauroides volans</i> | Greater Glider | | V | 15 records 1997 to 2009; (Department of the Environment 2016). |
| | Vespertilionidae | <i>Falsistrellus tasmaniensis</i> | Eastern False Pipistrelle | V | | Recorded 2018; (OEH 2017c). |
| Birds | Accipitridae | <i>Hieraetus morphnoides</i> | Little Eagle | V | | Three records 2002 to 2009; (Scientific Committee 2010a). |
| | Artamidae | <i>Artamus cyanopterus</i> | Dusky Woodswallow | V | | Recorded 2001, 2019; (Scientific Committee 2016). |
| | Neosittidae | <i>Daphoenositta chrysoptera</i> | Varied Sittella | V | | Two records 1997 to 2014; (Scientific Committee 2010b). |
| | Petroicidae | <i>Petroica boodang</i> | Scarlet Robin | V | | Six records 1999 to 2019; (OEH 2017d). 1997-09-27 |
| | Petroicidae | <i>Petroica phoenicea</i> | Flame Robin | V | | 43 records 1997 to 2019; (OEH 2017e). |
| | Psittacidae | <i>Neophema pulchella</i> | Turquoise Parrot | V | | Recorded 1978; (OEH 2017f). |
| | Strigidae | <i>Ninox strenua</i> | Powerful Owl | V | | Recorded 2019; (OEH 2017g). |

¹Threatened Species listed under the Biodiversity Conservation Act 2016.

²Threatened Species listed under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.

but less commonly, *Hieraaetus morphnoides* (Little Eagle) and *Falco berigora* (Brown Falcon). Single records of *Acanthiza uropygialis* (Chestnut-Rumped Thornbill), *Acanthagenys rufogularis* (Spiny-cheeked Honeyeater) and *Neophema pulchella* (Turquoise Parrot) are unusual for the area and require further verification. These are likely observations of vagrants, like *Certhionyx variegatus* (Pied Honeyeater) recently sighted in the area, having ventured eastwards during drought conditions.

Currently five widespread amphibians are recorded for the area (Appendix 4). The amphibian record for the SCA is likely to be an under-estimate given that 10 species have been recorded in the Orange district (ALA 2018 and authors' pers. obs.).

Twenty reptilian species have been recorded for the SCA (Appendix 4). These records contain only one snake *Austrelaps ramsayi* (Highland Copperhead), again indicative of the lack of intensive survey. Seven snake species are recorded for inhabited areas near the SCA, along with one turtle. The 19 lizard taxa recorded for the SCA are all widespread common species, however four, along with the Highland Copperhead snake occur at their westernmost range limits (Appendix 4). The lizards are a mixture of highland south-eastern, coastal and western inland species. As with the snakes, the known lizard diversity is likely to be conservative.

One fish species is among the biota recorded near the boundary of the SCA, in Towac/Molong Creek (Appendix 4).

Invertebrates

Over 210 species of invertebrates (Table 2), have been recorded for the SCA (ALA and other database sources, 2018), notwithstanding a lack of systematic survey and published accounts. The insects range across some 14 Orders within 81 families and over 150 genera. A compilation of the invertebrates by Dr Murray Fletcher is available from the authors upon request.

A single rare species *Cephalofovea pavimenta* (Mt Canobolas Velvet Worm) is endemic to Mt Canobolas (Reid et al. 1995) and lives inside rotting logs where it hunts for other small invertebrates. In eastern Australia several Velvet Worms exist as distinct populations that have been isolated from other populations for millions of years (Tait et al. 1990), and may even date back to the breakup of the Gondwana supercontinent. Each is considered rare and vulnerable (New 1995) and hence their presence is a good indicator of environmental quality. Two fluorescent yellow Planarian Worm species occur on the mountain. One is considered

an outlying colour variant of *Fletchamia* cf. *sugdeni* isolated from its known distribution in Victoria and Tasmania (L. Winsor pers. comm.). It appears after rain and is commonly observed along walking tracks (S. Woodhall pers. comm.). The other is possibly also a colour variant of *Caenoplana* cf. *sulphurea*, a more widespread species in south eastern Australia and also at its northern range limit in the region (L. Winsor pers. comm.). These species are predatory and normally live in deep leaf litter to avoid desiccation.

A cricket, a flightless darkling beetle, several moths and leafhoppers represent unnamed taxa (M. Fletcher pers. comm.) and two named species, *Monomorium crinitum* and *Johnrehnia canoblaensis* have their type localities as Mt Canobolas. Twelve mollusc species have been observed within the SCA, five of which are endemic to NSW; *Anabellia occidentalis*, *Brevisentis atratus*, *B. jacksoniensis*, *Elsothera brazieri*, and *Galadistes molong* while *Scelidoropa sarahjanae* is endemic to NSW and NE Victoria. Eight species are rare, regionally significant and also likely indicative of the relictual nature of the mountain.

CONCLUSION

Mount Canobolas is a prominent volcanic inselberg with a distinct relictual montane and sub-alpine flora displaying independently evolving biodiversity that is compositionally distinct from those in all other high altitude areas of the continent. It is an iconic natural remnant area located within the heavily cleared landscapes of Central Western NSW. The physiography of the MCV, its altitude, geology, soils, isolation from other high altitude areas and influence on the local weather have united to produce a biota specific to the mountain, especially within the SCA. At a landscape level, geodiversity and climate are important drivers of vegetation (Keith 2011). However, there is only tenuous evidence that the MCV geology has had an influence on the biota. No association could be discerned among the bryoflora whereas there does appear to be some substrate-specific specialisation among the lichens. Likewise the trachyte rock plate heathlands appear to be compositionally different and unique to the MCV. The endemic *E. canobolensis* also shows a strong affinity to the MCV footprint, and an *Asterolasia* shrub is suggested as a possible basaltic specialist. The heterogeneity of the core volcanic pile of the MCV, on which the SCA is centred, may be a factor precluding any strong geological associations. In other respects Mt Canobolas functions as both a

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refugium for declining species and an evolutionary nursery for new species, driven by its isolation from other high altitude areas along the GD.

This SCA is a scientifically important area containing unique components of genetic variation and irreplaceable biodiversity of high conservation value and is invaluable for biogeographical comparisons. Significantly it hosts at least 10 endemic species and 14 threatened species including 2 plant, 5 mammal and 7 bird species. Mt Canobolas hosts unique sub-alpine rock plate communities with a combination of uncommon cryptogams, including an Endangered lichen community, along with several plant species rarely recorded elsewhere.

The presence of multiple endemic species in diverse groups of flora and fauna in the SCA parallels the findings of high levels of endemism on Mt Kaputar, suggesting that similar evolutionary forces are operating on the two dormant central volcanoes. Both are geographically isolated landlocked islands of high altitude habitats that appear to provide ideal environments for speciation. After the Late Miocene, when the MCVC had ceased activity, the land surface of the eastern highlands would have been much higher with alpine and sub-alpine vegetation considerably more widespread and interconnected than it is today. A long period of erosional activity has lowered the land surfaces resulting in the contraction and fragmentation of sub-alpine habitats which ultimately led to the stranding of remnant communities and populations on Mt Canobolas. The isolation of Mt Canobolas has been in place for long enough to allow the evolution of multiple new life forms, a process known as vicariant speciation, essentially by the splitting of populations into isolated fragments that subsequently evolve independently (e.g. Crisp and Cook 2007; Rix and Harvey 2012). It is postulated that many of the endemic species with close relatives elsewhere have evolved into new species on Mt Canobolas by vicariance where exchange of genetic material has been prevented by geographical and ecological isolation.

Alternatively, Mt Canobolas could have acted as a refugium for formerly widespread species that have become extinct elsewhere (Hope et al. 2004). For these species Mt Canobolas SCA is an important refugium. The Velvet Worm and other relictual species may fit into this category.

The evidence for specialist basalt taxa being responsible for endemism is limited, but nevertheless a possibility. *Asterolasia rupestris* subsp. *rupestris* is restricted to two of the volcanoes on the Inland Hotspot Track. Relict populations of the species are endemic to the volcanic track itself. It is possible this

taxon evolved on the track as a basalt specialist and was formerly more widespread when the volcanic chain was more continuous. The *Asterolasia* has now retreated to high altitude refugia on Mt Canobolas and Mt Kaputar. However, the Mt Canobolas and Mt Kaputar populations appear to have been isolated from each other for sufficient time to have differentiated morphologically into distinct taxa (J. Bruhl and I. Telford pers. comm.). *Phebalium* populations restricted to trachyte rock outcrops in the Warrumbungles and the MCVC are possible further substrate specific specialists that are not conspecific.

Two endangered ecological plant communities exist within the SCA. In addition, Hunter (2002) noted the unique composition of the rock outcrop heathland vegetation and its susceptibility to loss owing to the small size and fragmentation of remnants. He also noted the unusual dominance of the endemic *Eucalyptus canobolensis* which confers a unique composition to the SCA's woodland and forest communities, especially Community 1, Stringybark-Peppermint Shrubby Open Forests and Woodlands. As such, the vegetation of the SCA is of considerable conservation significance. The vegetation communities on Mt Canobolas are the result of long-standing ecological and evolutionary processes. Accordingly, the Mt Canobolas SCA provides examples of the ecological responses of vegetation assemblages to isolation, longitudinal displacement and climatic gradients.

A vast and under-explored reservoir of genetic diversity resides in and around the SCA, particularly among the vascular flora (120 taxa) and fungi (46 taxa) that are disjunct, rare or at the limits of their natural geographic ranges. In all 200 species (Table 2), c. 23% of the known native biota, are at their range limit in or in close proximity to the SCA. Whilst the majority of these are among the cryptogams and vascular plants, for most of the invertebrate taxa however, there isn't sufficient information to determine their status in this context. A small number of species, five vascular plants and two fungi are northern species which occur at their southernmost range limits around or on the mountain. A larger number, (24 fungi, 20 vascular plant and 8 bryophytes) are clearly species with their distributional strongholds in southern regions, being at their northernmost range limit on or near the MCVC. Many of these have strong sub-alpine affinities. Others (93 vascular plant, 16 fungi and 5 bryophyte species) are at their westernmost distribution within the CW of NSW and comprise many coastal and Blue Mountains species. Many of these species at the edges of their ranges have become stranded outlying populations that are ecologically and geologically disconnected from occurrences elsewhere. This disconnection has

likely set them on a distinct evolutionary pathway over the millennia, potentially leading to speciation.

Range edges are known to be characterized by increased genetic isolation, genetic differentiation, and variability in individual and population performance (Sexton et al. 2009) so are highly important for conservation.

As well as offering abundant opportunities for taxonomic research, examples of ecological, refugium and evolutionary vicariance responses have been identified within the SCA. They provide many fertile avenues for research and education into landlocked island systems, longitudinal displacement and climatic gradients. These same features of the SCA, coupled with the biodiversity, species richness and unusually high representation of irreplaceable species and communities, not only amplify its fundamental scientific value but vindicate the imperative for its nature conservation, in perpetuity.

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MOUNT CANOBOLAS BIODIVERSITY AND ENDEMISM

Appendix 1. Vascular plants recorded for Mt Canobolas State Conservation Area (AVH database 2018 and authors' observations) (*Exotic species).

| Family | Scientific name | Common name | Regional distribution | Range limit | Remarks |
|------------------------------|--------------------------------------------|----------------------|-----------------------|--------------|----------------------------------------------------------------|
| GYMNOSPERMS | | | | | |
| Cupressaceae | <i>Callitris endlicheri</i> | Black Cypress Pine | Widespread | | Localised, Devils Hole |
| Pinaceae | * <i>Pinus radiata</i> | Monterey Pine | Widespread | | Wilding, scattered throughout, especially perimeter areas |
| FERNS AND FERN ALLIES | | | | | |
| Aspleniaceae | <i>Asplenium flabellifolium</i> | Necklace Fern | Widespread | | Common |
| | <i>Pleurosorus subglanulosus</i> | Blanket Fern | Widespread | | Localised |
| Blechnaceae | <i>Blechnum nudum</i> | Fishbone Water Fern | Widespread | Westernmost | Outlier at Mingham Springs |
| Dennstaedtiaceae | <i>Histiopteris incisa</i> | Bat's Wing Fern | Widespread | | Localised, Federal Falls |
| | <i>Pteridium esculentum</i> | Bracken | Widespread | | Common |
| Dryopteridaceae | <i>Lastreopsis acuminata</i> | Creeping Shield Fern | Widespread | Westernmost | Disjunct. Localised, Federal Falls |
| | <i>Polystichum proliferum</i> | Mother Shield Fern | Widespread | Westernmost | Disjunct. Localised, Fern Gully, The Walls |
| Ophioglossaceae | <i>Ophioglossum lusitanicum</i> | Adders Tongue | Widespread | | Occasional |
| Pteridaceae | <i>Adiantum aethiopicum</i> | Common Maidenhair | Widespread | | Occasional |
| | <i>Cheilanthes austrotenuifolia</i> | Rock Fern | Widespread | | Common |
| | <i>Cheilanthes distans</i> | Bristly Cloak Fern | Widespread | | Uncommon |
| | <i>Cheilanthes sieberi</i> subsp. | Poison Rock Fern | Widespread | | Common |
| | <i>Pellaea falcata</i> | Sickle Fern | Widespread | Westernmost | Uncommon |
| | <i>Pellaea nana</i> | Dwarf Sickle Fern | Widespread | Westernmost | Localised, Federal Falls |
| MONOCOTYLEDONS | | | | | |
| Antheriaceae | <i>Arthropodium milleflorum</i> | Pale Vanilla-lily | Widespread | | Common |
| | <i>Arthropodium minus</i> | | Widespread | | |
| | <i>Caesia calliantha</i> | Grass Lily | Widespread | Westernmost | Localised, Orange View Lookout area |
| Asphodelaceae | <i>Thysanotus tuberosus</i> | Common Fringe Lily | Widespread | | Common |
| | <i>Bulbine bulbosa</i> | Native Leek | Widespread | | Common |
| | <i>Bulbine</i> sp. (ms) | | Restricted | Endemic | Several rocky locations in SCA |
| Colchicaceae | <i>Burchardia umbellata</i> | Milkmaids | Widespread | Northernmost | Fire ephemeral. Possible outliers at Wellington, Harvey Ranges |
| Cyperaceae | <i>Wurmbea dioica</i> subsp. <i>dioica</i> | Early Nancy | Widespread | | Occasional |
| | <i>Carex appressa</i> | Tall Sedge | Widespread | | Soaks |
| | <i>Carex breviculmis</i> | | Widespread | Westernmost | Outlier at Warrumbungles |
| | <i>Carex gaudichaudiana</i> | | Widespread | Westernmost | |
| | <i>Carex incomitata</i> | | Widespread | Westernmost | Common |

| | | | | | |
|--------------|---------------------------------------------------------|------------------------|------------|--------------|---------------------------|
| | | Knob Sedge | Widespread | Westernmost | Rare |
| | <i>Carex inversa</i> | | Widespread | Westernmost | |
| | <i>Carex longebrachiata</i> | | Widespread | Westernmost | Outlier at Mullengudgerly |
| | <i>Cyperus flavidus</i> | Yellow Flat-sedge | Widespread | Westernmost | Common, damp areas |
| | <i>Cyperus sanguinolentus</i> | | Widespread | | Uncommon, soaks |
| | <i>Eleocharis acuta</i> | | Widespread | Westernmost | Common, damp areas |
| | <i>Eleocharis atricha</i> | | Widespread | | |
| | <i>Isolepis australiensis</i> | | Widespread | Westernmost | Outlier at Keewong Creek |
| | <i>Isolepis gaudichaudiana</i> | Benambra Club-sedge | Widespread | Westernmost | |
| | <i>Isolepis hookeriana</i> | | Widespread | | |
| | <i>Isolepis subtilissima</i> | | Widespread | Westernmost | |
| | <i>Lipocarpha microcephala</i> | Button Rush | Widespread | Range extn | Rare. Unrecorded for CT |
| | <i>Lepidosperma gunnii</i> | | Widespread | Westernmost | Localised, Devils Hole |
| | <i>Lepidosperma laterale</i> | | Widespread | | |
| | <i>Schoenus apogon</i> | Common Bog-rush | Widespread | | Common, soaks |
| | <i>Hypoxis hygrometrica</i> var. <i>hygrometrica</i> | Golden Weather-grass | Widespread | Westernmost | Uncommon, soaks |
| | <i>Iris germanica</i> | Tall Bearded Iris | Widespread | | |
| Iridaceae | <i>Juncus australis</i> | | Widespread | Westernmost | Outlier at Cowra |
| Juncus | <i>Juncus bifonius</i> | Toad Rush | Widespread | Westernmost | Outlier at Keewong Creek |
| | <i>Juncus fockeii</i> | | Widespread | | |
| | <i>Juncus homalocaulis</i> | | Widespread | | |
| | <i>Juncus remotiflorus</i> | | Widespread | | |
| | <i>Juncus sarophorus</i> | | Widespread | | |
| | <i>Juncus subsecundus</i> | | Widespread | | |
| | <i>Juncus vaginatus</i> | | Widespread | | |
| | <i>Luzula densiflora</i> | | Widespread | | Occasional |
| | <i>Luzula flaccida</i> | | Widespread | | Common |
| | <i>Luzula modesta</i> | | Widespread | Westernmost | |
| | <i>Luzula ovata</i> | | Widespread | Westernmost | |
| Lomandraceae | <i>Lomandra confertifolia</i> subsp. <i>pallida</i> | Mat-rush | Widespread | Southernmost | |
| | <i>Lomandra filiformis</i> subsp. <i>filiformis</i> | Wattle Mat-rush | Widespread | | Common |
| | <i>Lomandra filiformis</i> subsp. <i>flavior</i> | Wattle Mat-rush | Widespread | | New record |
| | <i>Lomandra longifolia</i> | Spiny-headed Mat-rush | Widespread | | |
| | <i>Lomandra multiflora</i> subsp. <i>multiflora</i> | Many-flowered Mat-rush | Widespread | | Common |

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|-------------|-----------------------------------------------|------------------------------|------------|--------------|----------------------------------------------------------------------|----------|
| Orchidaceae | <i>Caladenia carnea</i> | Pink Fingers | Widespread | Endemic | Uncommon | Uncommon |
| | <i>Caladenia congesta</i> | Black Tongue Caladenia | Widespread | Northernmost | Uncommon, Devils Hole. Outlier in Calula Range, possibly also Mudgee | |
| | <i>Caladenia fitzgeraldii</i> | Spider Orchid | Widespread | Westernmost | Rare | |
| | <i>Caladenia fuscata</i> | Dusky Fingers | Widespread | | Uncommon | |
| | <i>Caladenia gracilis</i> | Musky Caladenia | Widespread | | | |
| | <i>Caladenia phaeoclavia</i> | Brown-clubbed Spider Orchid | Widespread | Westernmost | Common. Outlier at Bowan Park | |
| | <i>Caladenia</i> sp. aff. <i>paterersonii</i> | | Extinct? | Endemic | Rare, possibly extinct. One plant only ever seen | |
| | <i>Calochilus campestris</i> | Copper Beard Orchid | Widespread | | Uncommon to rare | |
| | <i>Calochilus robertsonii</i> | Purplish Beard Orchid | Widespread | | Uncommon to rare | |
| | <i>Chiloglottis trilabra</i> | | Widespread | Westernmost | | |
| | <i>Chiloglottis valida</i> | Large Bird Orchid | Widespread | Northernmost | Common | |
| | <i>Corybas hispidus</i> | Bristly Helmet Orchid | Widespread | Westernmost | Occasional | |
| | <i>Corybas incurvus</i> | Slaty Helmet Orchid | Widespread | Northernmost | Occasional. Outlier at Barrington Tops | |
| | <i>Dipodium punctatum</i> | Hyacinth Orchid | Widespread | Westernmost | Occasional, localised. Outlier in Warrumbungles | |
| | <i>Dipodium</i> sp. aff. <i>atropurpureum</i> | | Unknown | ?Endemic | Occasional to common | |
| | <i>Diuris pardina</i> | Leopard Orchid | Widespread | Northernmost | Common, localised. Outliers to north | |
| | <i>Diuris</i> sp. aff. <i>chryseopsis</i> | | Restricted | Endemic? | Rare | |
| | <i>Diuris sulphurea</i> | Tiger Orchid | Widespread | | Scattered, common | |
| | <i>Eriochilus cucullatus</i> | Parsons Bands | Widespread | | Common | |
| | <i>Gastrodia procera</i> | Potato Orchid | Widespread | Westernmost | Disjunct. Rare | |
| | <i>Gastrodia sesamoides</i> | Cinnamon Bells | Widespread | Westernmost | Disjunct. Occasional, scattered | |
| | <i>Genoplesium sagittiferum</i> | A Midge Orchid | Widespread | Westernmost | Disjunct. Common. Conimbla material reclassified <i>G. systemum</i> | |
| | <i>Microtis parviflora</i> | Slender Onion Orchid | Widespread | | Common | |
| | <i>Microtis unifolia</i> | Common Onion Orchid | Widespread | | Abundant | |
| | <i>Prasophyllum brevilabre</i> | Short-lipped Leek Orchid | Widespread | Westernmost | Uncommon. Outlier in Pilliga | |
| | <i>Prasophyllum</i> sp. aff. <i>odoratum</i> | | Restricted | Endemic | Rare, localised, fire ephemeral | |
| | <i>Pterostylis aestiva</i> | Long-tongue Summer Greenhood | Widespread | Northernmost | Disjunct. Localised, uncommon | |
| | <i>Pterostylis decurva</i> | Summer Greenhood | Widespread | Westernmost | Rare | |
| | <i>Pterostylis falcata</i> | Sickle Greenhood | Extinct? | | Not seen in last 50 years, likely locally extinct | |
| | <i>Pterostylis nutans</i> | Nodding Greenhood | Widespread | | Uncommon, localised | |

| | | |
|---------------------------------------------------|------------|----------------------------------------------|
| <i>Pterostylis rubescens</i> | Widespread | Uncommon |
| <i>Pterostylis</i> sp. B | Widespread | Rare |
| <i>Pterostylis tenuis</i> | Restricted | Mostly confined to CT. Outlier at Glen Elgin |
| <i>Thelymitra brevifolia</i> | Widespread | Northernmost |
| <i>Thelymitra carnea</i> | Widespread | Outlier at Barrington Tops |
| <i>Thelymitra megalypira</i> | Widespread | Uncommon |
| <i>Thelymitra pauciflora</i> | Widespread | Uncommon |
| <i>Thelymitra peniculata</i> | Widespread | Common |
| <i>Thelymitra simulata</i> | Restricted | Occasional |
| <i>Thelymitra</i> sp. aff. <i>ixioides</i> | Widespread | Disjunct. Rare, localised, Devils Hole |
| Phormiaceae | Widespread | Common |
| <i>Dianella caerulea</i> var. <i>caerulea</i> | Widespread | Westernmost |
| <i>Dianella longifolia</i> var. <i>longifolia</i> | Widespread | Westernmost |
| <i>Dianella revoluta</i> var. <i>revoluta</i> | Widespread | |
| <i>Dianella tasmanica</i> | Widespread | Westernmost |
| <i>Stypandra glauca</i> | Widespread | Abundant after fire |
| * <i>Agrostis stolonifera</i> | Widespread | |
| * <i>Aira cupaniana</i> | Widespread | |
| <i>Anthosachne scabra</i> | Widespread | Occasional |
| <i>Aristida echinata</i> | Widespread | |
| <i>Austrostipa densiflora</i> | Widespread | Range extn |
| <i>Austrostipa scabra</i> subsp. <i>falcata</i> | Widespread | Uncommon |
| <i>Austrostipa scabra</i> subsp. <i>scabra</i> | Widespread | Occasional |
| * <i>Briza maxima</i> | Widespread | Occasional |
| * <i>Briza minor</i> | Widespread | |
| * <i>Bromus diandrus</i> | Widespread | |
| * <i>Bromus hordeaceus</i> | Widespread | |
| * <i>Bromus molliformis</i> | Widespread | |
| * <i>Bromus sterilis</i> | Widespread | |
| <i>Cymbopogon refractus</i> | Widespread | Uncommon |
| * <i>Dactylis glomerata</i> | Widespread | |
| <i>Dichelachne crinita</i> | Widespread | Occasional |
| <i>Dichelachne inaequiglumis</i> | Widespread | Occasional |
| <i>Dichelachne micrantha</i> | Widespread | Occasional |
| <i>Dichelachne rara</i> | Widespread | Occasional |

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|-------------------------------------------------------|-----------------------------|--------------|------------|---------------------------------------------------------|
| <i>Dichelachne siebertiana</i> | | | Widespread | Occasional |
| <i>Digitaria brownii</i> | Cotton Panic Grass | | Widespread | Occasional |
| <i>Echinopogon caespitosus</i> | Bushy Hedgehog-grass | | Widespread | Occasional |
| <i>Echinopogon ovatus</i> | Forest Hedgehog-grass | | Widespread | Common |
| <i>Eragrostis brownii</i> | Brown's Lovegrass | | Widespread | |
| <i>Festuca asperula</i> | Graceful Fescue | | Widespread | Rarely seen, but proliferated after fire |
| * <i>Holcus lanatus</i> | Yorkshire Fog | | Widespread | |
| * <i>Hordeum leporinum</i> | Barley Grass | | Widespread | |
| <i>Imperata cylindrica</i> | Blady Grass | Westernmost | Widespread | Uncommon |
| <i>Microlaena stipoides</i> var. <i>stipoides</i> | Weeping Grass | | Widespread | Common |
| <i>Panicum simile</i> | Two-colour Panic | | Widespread | Uncommon |
| * <i>Paspalum dilatatum</i> | Paspalum | | Widespread | |
| * <i>Poa annua</i> | Winter Grass | | Widespread | |
| <i>Poa labillardierei</i> var. <i>labillardierei</i> | Tussock | | Widespread | Occasional |
| <i>Poa siebertiana</i> var. <i>cyanophylla</i> | | Northernmost | Widespread | Occasional |
| <i>Poa siebertiana</i> var. <i>siebertiana</i> | Snowgrass | | Widespread | Abundant |
| <i>Poa tenera</i> | Slender Tussock-grass | Northernmost | Widespread | Occasional. Outliers at Cookamidgera, Cox's Gap, Olinda |
| <i>Rytidosperma erianthum</i> | Wallaby Grass | | Widespread | Common |
| <i>Rytidosperma penicillatum</i> | Slender Wallaby Grass | Westernmost | Widespread | Possible outlier in Weddin Mts |
| <i>Rytidosperma pilosum</i> | Smooth-flower Wallaby Grass | | Widespread | Occasional |
| <i>Rytidosperma racemosum</i> var. <i>racemosum</i> | | | Widespread | Common |
| <i>Rytidosperma setaceum</i> | Smallflower Wallaby Grass | | Widespread | Occasional |
| * <i>Sorghum halepense</i> | Johnson Grass | | Widespread | |
| <i>Sporobolus creber</i> | Western Rat-tail Grass | | Widespread | Rare |
| <i>Themeda triandra</i> | Kangaroo Grass | | Widespread | |
| <i>Tripogon loliiformis</i> | Fiveminute Grass | | Widespread | Localised and uncommon |
| * <i>Vulpia bromoides</i> | Squirrel Tail Fescue | | Widespread | |
| * <i>Vulpia muralis</i> | | | Widespread | |
| <i>Xanthorrhoea glauca</i> subsp. <i>angustifolia</i> | A Grass Tree | | Widespread | Localised and uncommon |
| DICOTYLEDONS | | | | |
| Adoxaceae | | | | |
| | * <i>Sambucus nigra</i> | Elderberry | Widespread | |

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|---------------|---------------------------------------------------------|-----------------------|-------------|---------------------------------------------------------------------------------------------------------------------------|
| Ameranthaceae | <i>Alternanthera</i> sp. A | | Widespread | Uncommon |
| Apiaceae | <i>Actinotus gibbonsii</i> | | Widespread | Localised, Devils Hole |
| | <i>Daucus glochidiatus</i> form F | Native Carrot | Widespread | |
| | <i>Hydrocotyle algida</i> | Pennywort | Widespread | Possible outlier at Tenterfield |
| | <i>Hydrocotyle laxiflora</i> | Stinking Pennywort | Widespread | Common |
| | <i>Hydrocotyle sibthorpioides</i> | | Widespread | Occasional |
| | <i>Lilaeopsis polyantha</i> | | Widespread | Disjunct |
| | <i>Oreomyrrhis eriopoda</i> | Australian Carraway | Widespread | Occasional |
| Araliaceae | <i>Astrotricha ledifolia</i> | | Widespread | Occasional. Outliers at Olinda, Tamworth, Tenterfield |
| | * <i>Hedera helix</i> | English Ivy | Widespread | Westernmost |
| | <i>Polyscias sambucifolia</i> subsp. <i>decomposita</i> | Ferny Panax | Widespread | Westernmost |
| | * <i>Tetrapanax papyrifer</i> | Rice Paper Plant | Widespread | |
| Asteraceae | * <i>Bidens pilosa</i> | Cobblers Pegs | Widespread | |
| | <i>Brachyscome dissectifolia</i> | Swamp Daisy | Widespread | Southernmost |
| | <i>Brachyscome psychocarpa</i> | Tiny Daisy | Widespread | Westernmost |
| | <i>Brachyscome spathulata</i> | | Widespread | Common |
| | <i>Calotis scabiosifolia</i> var. <i>integrifolia</i> | Rough Burr-daisy | Widespread | Occasional. Outliers at Taree and Manara |
| | <i>Cassinia aculeata</i> subsp. <i>aculeata</i> | Common Cassinia | Widespread | Common. Outliers at Mt Airy and Point Lookout |
| | <i>Cassinia laevis</i> | Cough Bush | Widespread | Occasional |
| | <i>Cassinia longifolia</i> | Shining Cassinia | Widespread | Common. Range extends sporadically to Kandos/Rylstone with rare outliers. Northern records possibly <i>C. straminea</i> . |
| | <i>Cassinia sifton</i> | Sifton Bush | Widespread | Common |
| | * <i>Centaurea calcitrapa</i> | Star Thistle | Widespread | |
| | * <i>Chondrilla juncea</i> | Skeleton Weed | Widespread | |
| | <i>Chrysocephalum apiculatum</i> | Common Everlasting | Widespread | |
| | <i>Chrysocephalum semipapposum</i> | Clustered Everlasting | Widespread | |
| | * <i>Cirsium vulgare</i> | Spear Thistle | Widespread | |
| | * <i>Coryza bonariensis</i> | Flaxleaf Fleabane | Widespread | |
| | * <i>Coryza sumatrensis</i> | Tall Fleabane | Widespread | |
| | <i>Coronidium scorpioides</i> | Button Everlasting | Widespread | Westernmost |
| | <i>Craspedia</i> sp. aff. <i>laminicola</i> | Billy-buttons | ?Restricted | ?Endemic |
| | * <i>Crepis capillaris</i> | Smooth Hawksbeard | Widespread | Mostly above 1000 m |

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|--------------------------------------------------------|-----------------------|------------|-------------------------------------------------------|
| <i>Cymbonotus lawsonianus</i> | Bears-ear | Widespread | Occasional |
| <i>Cymbonotus preissianus</i> | Austral Bear's Ear | Widespread | Outliers in Mullion Range, Barrington Tops and Yetman |
| <i>Euchiton involucreatus</i> | Star Cudweed | Widespread | Outlier in Mandagery SF |
| <i>Euchiton japonicus</i> | Creeping Cudweed | Widespread | |
| * <i>Hypochoeris radicata</i> | Catsear, Flatweed | Widespread | |
| * <i>Lactuca serriola</i> | Prickly Lettuce | Widespread | |
| <i>Lagenophora stipitata</i> | Blue Bottle-daisy | Widespread | Occasional |
| * <i>Madia sativa</i> | Tarweed, Pitchweed | Widespread | |
| <i>Microseris lanceolata</i> | Yam Daisy | Widespread | Occasional |
| <i>Olearia chrysophylla</i> | | Widespread | Disjunct. Uncommon, upper slopes |
| <i>Olearia erubescens</i> | | Widespread | Rare, Devils Hole. Outliers to north |
| <i>Olearia megalophylla</i> | Large-leaf Daisy Bush | Widespread | Disjunct. Rare, possible misidentification |
| <i>Olearia philopappa</i> subsp. <i>continentalis</i> | Dusty Daisy-bush | Widespread | Disjunct. Localised, common, Devils Hole |
| <i>Senecio bathurstianus</i> | | Widespread | Common |
| <i>Senecio diaschides</i> | | Widespread | Occasional |
| <i>Senecio hispidulus</i> | Hill Fireweed | Widespread | Outliers at Condobolin, Lake Cargelligo |
| <i>Senecio linearifolius</i> var. <i>macrodontus</i> | Fireweed Groundsel | Widespread | Uncommon |
| <i>Senecio minimus</i> | | Widespread | Uncommon |
| <i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i> | Variable Groundsel | Widespread | |
| <i>Senecio prenanthoides</i> | | Widespread | Occasional |
| <i>Senecio quadridentatus</i> | Cotton Fireweed | Widespread | Common |
| <i>Sigesbeckia australiensis</i> | | Widespread | Occasional |
| <i>Sigesbeckia orientalis</i> subsp. <i>orientalis</i> | Indian Weed | Widespread | Occasional |
| * <i>Silybum marianum</i> | Variiegated Thistle | Widespread | |
| <i>Solenogyne dominii</i> | | Widespread | Uncommon |
| * <i>Sonchus oleraceus</i> | Common Sowthistle | Widespread | |
| * <i>Taraxacum officinale</i> | Dandelion | Widespread | |
| <i>Vittadina cuneata</i> var. <i>cuneata</i> | Fuzzweed | Widespread | |
| * <i>Amsinckia calycina</i> | | Widespread | |
| * <i>Amsinckia intermedia</i> | Common Fiddleneck | Widespread | |
| * <i>Anchusa arvensis</i> | Wild Bugloss | Widespread | |
| <i>Cynoglossum australe</i> | | Widespread | Common |

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|----------------------------|--------------------------------------------------------|----------------------------------|----------------------|------------------------------------------------------|-----------------------|
| | <i>*Echium vulgare</i> | Vipers Bugloss | Widespread | | |
| | <i>Hackelia suaveolens</i> | | Widespread | | |
| | <i>Myosotis australis</i> | Australian Forget-me-not | Widespread | Occasional | |
| Brassicaceae | <i>*Myosotis discolor</i> | Forget-me-not | Widespread | | |
| | <i>Cardamine gunnii</i> | | Widespread | Westernmost | |
| | <i>Cardamine paucijuga</i> | | Widespread | | |
| Callitrichaceae | <i>*Hirschfeldia incana</i> | Buchan Weed | Widespread | | |
| | <i>*Callitriche stagnalis</i> | Common Starwort | Widespread | | |
| Campanulaceae | <i>Isotoma fluviatilis</i> subsp. <i>fluviatilis</i> | Swamp Isotome | Widespread | Westernmost | |
| | <i>Lobelia gibbosa</i> | Tall Lobelia | Widespread | Occasional, fire ephemeral | |
| | <i>Lobelia pedunculata</i> | Matted Pratia | Widespread | Westernmost | |
| | <i>Wahlenbergia communis</i> | Tufted Bluebell | Widespread | Uncommon | |
| | <i>Wahlenbergia luteola</i> | | Widespread | Occasional | |
| | <i>Wahlenbergia multicaulis</i> | Tadgell's Bluebell | Widespread | Occasional | |
| | <i>Wahlenbergia planiflora</i> subsp. <i>longipila</i> | Flat Bluebell | Widespread | Southernmost | |
| | <i>Wahlenbergia stricta</i> subsp. <i>stricta</i> | Tall Bluebell | Widespread | Occasional | |
| | Caprifoliaceae | <i>Wahlenbergia victoriensis</i> | | Unknown | Northernmost |
| | | <i>*Lonicera japonica</i> | Japanese Honeysuckle | Widespread | Uncommon, moist gully |
| Caryophyllaceae | <i>*Cerastium balearicum</i> | Lesser Mouse-ear Chickweed | Widespread | | |
| | <i>*Cerastium glomeratum</i> | Mouse-ear Chickweed | Widespread | | |
| | <i>*Petrohragia nanteuilii</i> | | Widespread | | |
| | <i>Scleranthus</i> sp. F. Itz Hill | Knawel | Widespread | Southernmost | |
| | <i>*Silene coronaria</i> | Rose Campion | Widespread | Common | |
| | <i>Stellaria angustifolia</i> | Swamp Starwort | Widespread | Uncommon, damp areas | |
| | <i>Stellaria flaccida</i> | | Widespread | Westernmost | |
| | <i>Stellaria pungens</i> | Prickly Starwort | Widespread | Westernmost | |
| | <i>Centrolepis strigosa</i> subsp. <i>strigosa</i> | | Widespread | Abundant. Outlier in Hervey Ranges Rare, in soaks | |
| | Chenopodiaceae | <i>Dysphania pumilio</i> | Small Crumbweed | Widespread | Common |
| <i>Hypericum gramineum</i> | | Small St. John's Wort | Widespread | Occasional | |
| Clusiaceae | <i>Hypericum japonicum</i> | | Widespread | Damp areas | |
| | <i>*Hypericum perforatum</i> | St. John's Wort | Widespread | | |
| Convolvulaceae | <i>Convolvulus angustissimus</i> | Blushing Bindweed | Widespread | Occasional | |

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|--------------|-------------------------------------------------------|----------------------|-------------|-------------------------------------|
| | <i>Dichondra repens</i> | Kidney Weed | Widespread | Common |
| Crassulaceae | <i>Crassula siebertiana</i> subsp. <i>siebertiana</i> | Australian Stonecrop | Widespread | Occasional |
| Dilleniaceae | <i>Hibbertia calycina</i> | Lesser Guinea Flower | Widespread | Uncommon |
| | <i>Hibbertia obtusifolia</i> | Hoary Guinea Flower | Widespread | Common |
| | <i>Hibbertia riparia</i> | Erect Guinea Flower | Widespread | Occasional |
| Droseraceae | <i>Drosera auriculata</i> | | Widespread | |
| | <i>Drosera peltata</i> | Sundew | Widespread | |
| Epacridaceae | <i>Acrotiche serrulata</i> | Honeypots | Widespread | Outlier at Yenda |
| | <i>Leucopogon attenuatus</i> | Beard-heath | Widespread | Occasional |
| | <i>Leucopogon ericoides</i> | Pink Beard-heath | Widespread | Occasional |
| | <i>Leucopogon fraseri</i> | | Widespread | Uncommon. Outlier in Goobang NP |
| | <i>Leucopogon virgatus</i> | | Widespread | Occasional |
| | <i>Melichrus</i> Mt Canobolas | Urn-heath | ?Restricted | ?Endemic |
| | <i>Monotoca scoparia</i> | Broom-heath | Widespread | Uncommon, scattered |
| Fabaceae | <i>Acacia brownii</i> | Heath Wattle | Widespread | |
| | <i>Acacia buxifolia</i> subsp. <i>buxifolia</i> | Box-Leaf Wattle | Widespread | |
| | <i>Acacia dealbata</i> subsp. <i>dealbata</i> | Silver Wattle | Widespread | Abundant |
| | <i>Acacia gummii</i> | Ploughshare Wattle | Widespread | Occasional |
| | <i>Acacia lanigera</i> var. <i>lanigera</i> | Woolly Wattle | Widespread | |
| | <i>Acacia melanoxylon</i> | Blackwood | Widespread | Common. Possible outlier near Dubbo |
| | <i>Acacia ulicifolia</i> | Prickly Moses | Widespread | |
| | <i>Acacia verniciflua</i> | Varnish Wattle | Widespread | Common |
| | <i>Bossiaea buxifolia</i> | | Widespread | |
| | * <i>Cytisus scoparius</i> subsp. <i>scoparius</i> | Scotch Broom | Widespread | |
| | <i>Daviesia latifolia</i> | Hop Bitter-pea | Widespread | Occasional |
| | <i>Daviesia leptophylla</i> | | Widespread | Occasional |
| | <i>Desmodium gummii</i> | Slender Tick-trefoil | Widespread | |
| | <i>Desmodium varians</i> | Slender Tick-trefoil | Widespread | Westernmost |
| | <i>Dilwynia phylloides</i> | | Widespread | |
| | * <i>Genista monspessulana</i> | Montpellier Broom | Widespread | |
| | <i>Glycine clandestina</i> | | Widespread | Common |
| | <i>Glycine tabacina</i> | | Widespread | Occasional |
| | <i>Haradenbergia violacea</i> | Purple Coral Pea | Widespread | |
| | <i>Hovea heterophylla</i> | | Widespread | Outliers at Bowen Park, Bumberry |
| | <i>Indigofera adesmiifolia</i> | Tick Indigo | Widespread | Occasional |
| | <i>Indigofera australis</i> | Australian Indigo | Widespread | Common |

| | | | | |
|--------------|-----------------------------------------------------------|------------------------|------------|-------------------------------------------------------------------------------------------------------|
| | <i>Lotus australis</i> | Australian Trefoil | Widespread | Uncommon |
| | * <i>Medicago polymorpha</i> | Burr Medic | Widespread | |
| | <i>Mirbella oxylobioides</i> | Mountain Mirbella | Widespread | Northernmost Disjunct. A southern species, outliers north of Lees Pinch and at Mt Kaputar, Pilliga |
| | <i>Pultenaea polifolia</i> | Dusky Bush-pea | Widespread | Westernmost Uncommon. Outlier in Goobang NP |
| | <i>Pultenaea setulosa</i> | Stony Bush-pea | Widespread | |
| | <i>Pultenaea spinosa</i> | Spiny Bush-pea | Widespread | Occasional |
| | <i>Pultenaea subternata</i> | Haresfoot Clover | Widespread | Scattered on slopes to west |
| | * <i>Trifolium arvense</i> | Hop Clover | Widespread | |
| | * <i>Trifolium campestre</i> | Yellow Suckling Clover | Widespread | |
| | * <i>Trifolium dubium</i> | White Clover | Widespread | |
| | * <i>Trifolium repens</i> | Gorse | Widespread | |
| | * <i>Vicia villosa</i> subsp. <i>villosa</i> | Russian Vetch | Widespread | |
| Gentianaceae | * <i>Centaureum erythraea</i> | Common Centaury | Widespread | |
| | * <i>Centaureum tenuiflorum</i> | | Widespread | |
| Geraniaceae | <i>Geranium homeanum</i> | Cranesbill Geranium | Widespread | Westernmost |
| | * <i>Geranium molle</i> subsp. <i>molle</i> | | Widespread | |
| | <i>Geranium potentilloides</i> var. <i>potentilloides</i> | | Widespread | Westernmost |
| | <i>Geranium solanderi</i> var. <i>solanderi</i> | Native Geranium | Widespread | Common |
| Goodeniaceae | <i>Pelargonium australe</i> | Native Storksbill | Widespread | Prolific fire ephemeral |
| | <i>Goodenia hederacea</i> subsp. <i>hederacea</i> | Forest Goodenia | Widespread | |
| Haloragaceae | <i>Gonocarpus elatus</i> | Raspwort | Widespread | Occasional |
| | <i>Haloragis heterophylla</i> | Rough Raspwort | Widespread | Common |
| | <i>Haloragis serra</i> | | Widespread | Occasional |
| Lamiaceae | * <i>Ajuga australis</i> | Austral Bugle | Widespread | |
| | <i>Mentha saturoioides</i> | White Horehound | Widespread | |
| | * <i>Mentha spicata</i> | Native Pennyroyal | Widespread | Uncommon |
| | <i>Prostanthera gilesii</i> | Spearmint | Widespread | Towac Creek |
| | * <i>Prunella vulgaris</i> | Self-heal | Restricted | Endemic Critically endangered |
| | <i>Scutellaria humilis</i> | Dwarf Skullcap | Widespread | |
| Lauraceae | <i>Cassytha pubescens</i> | | Widespread | Occasional |
| Loranthaceae | <i>Anyema miquelii</i> | | Widespread | |

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| | | | | | |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| Malaceae | <i>Amyema pendula</i> subsp. <i>pendula</i> * <i>Cotoneaster glaucophyllus</i> * <i>Crataegus monogyna</i> | Glaucous Cotoneaster Hawthorn | Widespread Widespread Widespread | | Widespread Widespread Widespread |
| Myrtaceae | <i>Calyrix tetragona</i> <i>Eucalyptus blakelyi</i> <i>Eucalyptus bridgesiana</i> <i>Eucalyptus canobolensis</i> | Common Fringe-myrtle Blakely's Red Gum Apple Box Silver-leaf Candlebark | Widespread Widespread Restricted | Common Uncommon Occasional Abundant. Localised Mt Canobolas volcanics | Common Uncommon Occasional Abundant. Localised Mt Canobolas volcanics |
| | <i>Eucalyptus dalrympleana</i> subsp. <i>dalrympleana</i> <i>Eucalyptus dives</i> | Mountain Gum Broad-leaved Peppermint | Widespread Widespread | Westernmost Westernmost | Abundant. Disjunct Abundant |
| | <i>Eucalyptus goniocalyx</i> <i>Eucalyptus macrorhyncha</i> <i>Eucalyptus pauciflora</i> <i>Eucalyptus polyanthemos</i> subsp. <i>polyanthemos</i> | Bundy Red Stringybark Snow Gum Red Box | Widespread Widespread Widespread Widespread | Occasional Abundant Abundant Uncommon | Occasional Abundant Abundant Uncommon |
| | <i>Eucalyptus stielatala</i> <i>Eucalyptus viminalis</i> <i>Kunzea parvifolia</i> <i>Leptospermum myrtifolium</i> <i>Boerhavia dominii</i> | Black Sally Ribbon Gum Violet Kunzea Myrtle Tea-tree Tarvine | Widespread Widespread Widespread Widespread Widespread | Uncommon Occasional Common Possible outlier West Wyalong | Uncommon Occasional Common Possible outlier West Wyalong |
| Nyctaginaceae | <i>Epilobium billardiereanum</i> subsp. <i>cinereum</i> | A Willow-herb | Widespread | | Widespread |
| Orobanchaceae | * <i>Orobanche minor</i> | | Widespread | | Widespread |
| Oxalidaceae | <i>Oxalis chinoides</i> <i>Oxalis exilis</i> <i>Oxalis peremans</i> | | Widespread Widespread Widespread | Westernmost Westernmost Westernmost | Scattered on slopes to west Common Occasional |
| Phyllanthaceae | <i>Phyllanthus occidentalis</i> | | Widespread | | Widespread |
| Pittosporaceae | <i>Poranthura microphylla</i> <i>Billardiera scandens</i> <i>Rhytidosporum procumbens</i> | Hairy Apple Berry | Widespread Widespread Widespread | Uncommon | Uncommon |
| Plantaginaceae | <i>Gratiola peruviana</i> * <i>Plantago lanceolata</i> <i>Plantago varia</i> * <i>Veronica anagallis-aquatica</i> * <i>Veronica arvensis</i> <i>Veronica calycina</i> | Australian Brooklime Lamb's Tongues Blue Water Speedwell Wall Speedwell Hairy Speedwell | Widespread Widespread Widespread Widespread Widespread | Westernmost Westernmost Westernmost Westernmost Westernmost | Common Common Outlier in Warrumbungles |

| | | Widespread | Westernmost | Westernmost | Specimen in RBG needs verification |
|-------------------------------------------------------|-----------------------|------------|--------------|--------------|--------------------------------------------------------------|
| <i>Veronica derwentiana</i> subsp. <i>derwentiana</i> | | Widespread | Westernmost | Westernmost | |
| <i>Veronica derwentiana</i> subsp. <i>subglauca</i> | | Widespread | Westernmost | Westernmost | Specimen in RBG needs verification |
| <i>Veronica gracilis</i> | Slender Speedwell | Widespread | Westernmost | Westernmost | Possible outlier near Barmedman |
| * <i>Navarretia squarrosa</i> | Californian Stinkweed | Widespread | | | |
| * <i>Acetosella vulgaris</i> | Sorrel | Widespread | | | |
| <i>Rumex brownii</i> | Swamp Dock | Widespread | | | Occasional |
| <i>Neopaxia australasica</i> | | Widespread | Westernmost | Westernmost | Soaks |
| <i>Monita fontana</i> subsp. <i>chondrosperma</i> | | Widespread | Northernmost | Northernmost | A southern species |
| * <i>Lysimachia arvensis</i> | Scarlet Pimpernel | Widespread | | | |
| <i>Hakea decurrens</i> subsp. <i>decurrens</i> | | Widespread | | | Uncommon |
| <i>Persoonia rigida</i> | | Widespread | | | |
| <i>Ranunculus amphitrichus</i> | Small River Buttercup | Widespread | Northernmost | Northernmost | A southern species. Outliers at Moonan Brook, Uralla, Walcha |
| <i>Ranunculus inundatus</i> | River Buttercup | Widespread | Westernmost | Westernmost | |
| <i>Ranunculus lappaceus</i> | Common Buttercup | Widespread | | | Common |
| <i>Ranunculus pumilio</i> var. <i>politus</i> | Ferny Buttercup | Widespread | Easternmost | Easternmost | Outlier Richmond |
| <i>Ranunculus pumilio</i> var. <i>pumilio</i> | Ferny Buttercup | Widespread | | | |
| <i>Cryptandra amara</i> var. <i>amara</i> | Bitter Cryptandra | Widespread | | | |
| <i>Pomaderris aspera</i> | Hazel Pomaderris | Widespread | Westernmost | Westernmost | Disjunct. Rare |
| <i>Acaena novae-zelandiae</i> | Bidgee-widgee | Widespread | Westernmost | Westernmost | Common |
| <i>Acaena ovina</i> | Sheep's Burr | Widespread | | | |
| <i>Aphanes australiana</i> | | Widespread | | | |
| * <i>Prunus laurocerasus</i> | Cherry Laurel | Widespread | | | |
| * <i>Rosa rubiginosa</i> | Sweet Briar | Widespread | | | |
| * <i>Rubus anglocandicans</i> | Blackberry | Widespread | | | |
| <i>Rubus parvifolius</i> | Native Raspberry | Widespread | | | |
| * <i>Rubus ulmifolius</i> | Blackberry | Widespread | | | |
| * <i>Sanguisorba minor</i> | Salad Burnet | Widespread | | | |
| <i>Asperula conferta</i> | Common Woodruff | Widespread | | | Common |
| <i>Asperula scoparia</i> | Prickly Woodruff | Widespread | Westernmost | Westernmost | |
| <i>Coprosma quadrifida</i> | Prickly Currant Bush | Widespread | Westernmost | Westernmost | Disjunct. Rare |
| * <i>Galium aparine</i> | Cleavers | Widespread | | | |
| * <i>Galium divaricatum</i> | Slender Bedstraw | Widespread | | | |
| <i>Galium gaudichaudii</i> | Rough Bedstraw | Widespread | | | |

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|------------------|------------------------------------------------------|---------------------------|------------|-------------|---------------------------------|
| | <i>Galium leptogonium</i> | | Widespread | | |
| | * <i>Galium murale</i> | Small Bedstraw | Widespread | | |
| | <i>Opercularia aspera</i> | Coarse Stinkweed | Widespread | | Occasional |
| | <i>Opercularia hispida</i> | Hairy Stinkweed | Widespread | | Occasional |
| | <i>Pomax umbellata</i> | Skullcaps | Widespread | | Common |
| Rutaceae | <i>Asterolasia rupestris</i> subsp. <i>rupestris</i> | | Restricted | ?Endemic | Localised to one area, rare |
| | <i>Phebalium squamulosum</i> complex | Scaly Phebalium | Restricted | ?Endemic | Localised in disparate colonies |
| Salicaceae | * <i>Salix x. fragilis</i> nothovar. <i>fragilis</i> | Crack Willow | Widespread | | |
| Santalaceae | <i>Exocarpos cupressiformis</i> | Native Cherry | Widespread | | Common |
| | <i>Exocarpos strictus</i> | Dwarf Cherry | Widespread | | |
| Sapindaceae | <i>Dodonaea boromifolia</i> | Fern-leaf Hop-bush | Widespread | | Common |
| | <i>Dodonaea viscosa</i> subsp. <i>angustissima</i> | Narrow-leaved Hopbush | Widespread | | Common |
| Scrophulariaceae | * <i>Verbascum thapsus</i> subsp. <i>thapsus</i> | Great Mullein | Widespread | | |
| | * <i>Verbascum virgatum</i> | Twiggy Mullein | Widespread | | |
| Solanaceae | * <i>Datura stramonium</i> | Common Thornapple | Widespread | | |
| | * <i>Solanum chenopodioides</i> | Whittip Nightshade | Widespread | | |
| | * <i>Solanum nigrum</i> | Black-berry / Nightshade | Widespread | | |
| | * <i>Solanum triflorum</i> | Three-flowered Nightshade | Widespread | | |
| Stackhousiaceae | <i>Stackhousia monogyna</i> | Creamy Candles | Widespread | | Occasional |
| Stylidiaceae | <i>Stylidium graminifolium</i> | Grass Trigger-plant | Widespread | | Occasional |
| Thymelaeaceae | <i>Pimelea curviflora</i> var. <i>gracilis</i> | Rice Flower | Widespread | Westernmost | Occasional |
| | <i>Pimelea latifolia</i> subsp. <i>hirsuta</i> | Rice Flower | Widespread | Westernmost | Disjunct |
| | <i>Pimelea ligustrina</i> subsp. <i>ligustrina</i> | Tall Rice Flower | Widespread | Westernmost | Disjunct |
| Urticaceae | <i>Pimelea limifolia</i> subsp. <i>caesia</i> | Slender Rice-flower | Widespread | Westernmost | Disjunct |
| | <i>Urtica incisa</i> | Stinging Nettle | Widespread | | Occasional |
| Valerianaceae | * <i>Centranthus ruber</i> subsp. <i>ruber</i> | Red Valerian | Widespread | | |
| Verbenaceae | * <i>Verbena bonariensis</i> | Purpletop | Widespread | | |
| Violaceae | <i>Viola betonicifolia</i> | Native Violet | Widespread | | Common |
| | <i>Viola hederacea</i> | Ivy-leaved Violet | Widespread | Westernmost | Occasional |

Appendix 2. Summary of conservation reserves in the near (eastern) Central West indicating year gazetted, area, along with native and exotic vascular plant species recorded in Bionet (2018a).

| Conservation Reserve | Year Gazetted | Area (ha) | Total Flora (No Species) | Native Flora (No Species) | Exotic Flora (No Species) | Exotic species (%) |
|----------------------|---------------|-----------|--------------------------|---------------------------|---------------------------|--------------------|
| Abercrombie KCR | 1997 | 1,434 | 206 | 178 | 28 | 13.6 |
| Abercrombie River NP | 1995 | 19,402 | 491 | 384 | 107 | 21.8 |
| Barton NR | 1972 | 529 | 125 | 99 | 26 | 20.8 |
| Borenore KCR | 1997 | 136 | 140 | 85 | 55 | 39.2 |
| Burwood Creek NR | ? | 34 | 85 | 66 | 19 | 22.3 |
| Copperhannia NR | 1972 | 3,497 | 212 | 193 | 19 | 8.9 |
| Eusdale NR | 2006 | 1,238 | 130 | 111 | 19 | 14.6 |
| Evans Crown NR | 1975 | 424 | 185 | 145 | 40 | 21.6 |
| Freemantle NR | 1973 | 361 | 136 | 111 | 25 | 18.4 |
| Gillindich NR | 2010 | 1,225 | 111 | 105 | 6 | 5.4 |
| Girralang NR | 1999 | 640 | 207 | 175 | 32 | 15.4 |
| Hill End HS | 1967 | 133 | 98 | 68 | 30 | 30.6 |
| Keeverstone SCA | 2011 | 1,164 | 51 | 47 | 4 | 7.8 |
| Keeverstone NP | 1979 to 2011 | 1,860 | 198 | 165 | 33 | 16.7 |
| Mount Canobolas SCA | 1997 | 1,672 | 425 | 337 | 88 | 20.7 |
| Mullion Range SCA | 1999 | 1,025 | 200 | 151 | 49 | 24.5 |
| Nuggetty SCA | 2010 | 1,146 | 156 | 116 | 40 | 25.6 |
| Razorback NR | 1988 | 2,647 | 243 | 222 | 21 | 8.6 |
| Turon NP | 2002 | 3,059 | 254 | 215 | 39 | 15.4 |
| Wambool NR | 1987 | 194 | 245 | 226 | 19 | 7.8 |
| Wiarborough NR | 2010 | 2,024 | 183 | 164 | 19 | 10.4 |
| Winburndale NR | 1967 | 10,718 | 339 | 297 | 42 | 12.4 |
| Mean | | | 200 | 166 | 34 | 17.4 |

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Appendix 3. Fungi recorded for Mt Canobolas SCA (ALA and other database sources 2018) (*exotic species).

| Family | Scientific name | Regional distribution | Range limit | Remarks |
|-------------------|---------------------------------------------|-----------------------|--------------|-------------------------------------------------------------------------------------------------------------------|
| Phylum | | | | |
| Ascomycota | | | | |
| Acarosporaceae | <i>Acarospora citrina</i> | Widespread | Northernmost | Volcanic rock. Northern slopes below summit |
| | <i>Acarospora fuscata</i> | Restricted | Northernmost | Volcanic rock around summit; restricted to SE mainland |
| | <i>Acarospora nodulosa</i> | Widespread | Easternmost | An inland species |
| | <i>Sarcogyne sekikaica</i> | Restricted | Endemic | Volcanic rock around summit |
| Candelariaceae | <i>Candelariella</i> cf. <i>coralliza</i> | Widespread | | Volcanic rock around summit |
| Cladoniaceae | <i>Cladia aggregata</i> | Widespread | < | On soil between boulders, summit |
| | <i>Cladia corallitizon</i> | Widespread | | On soil, NE forest slopes |
| | <i>Cladia fuliginosa</i> | Restricted | Northernmost | Scattered small loose colonies, NE forest slopes and grasslands; restricted to SE Australia |
| | <i>Cladia muelleri</i> | Widespread | | On soil, NE forest slopes |
| | <i>Cladonia chlorophaea</i> | < Widespread | | On soil, W face of mountain |
| | <i>Cladonia corniculata</i> | Widespread | Westernmost | On damp soils and crevices among rocks, W face of mountain |
| | <i>Cladonia fimbriata</i> | Widespread | Westernmost | On soil, slopes and rocky outcrops with stunted trees |
| | <i>Cladonia glebosa</i> | Widespread | | On charred wood, W face of mountain |
| | <i>Cladonia sarmentosa</i> | Widespread | Westernmost | On shaded, moist earth bank, W face of mountain |
| | <i>Cladonia sulcata</i> var. <i>striata</i> | Widespread | Westernmost | On soil, NE forest slopes |
| Collemataceae | <i>Collema leucocarpum</i> | Widespread | | On mossy volcanic rocks and on <i>Acacia melanoxylon</i> , W face of mountain |
| | <i>Lathegrium durtizii</i> | Widespread | | On soil and rock, stunted forest on rocky outcrops, W face of mountain |
| Gomphillaceae | <i>Gyalideopsis halocarpa</i> | Restricted | Endemic | Near summit, exposed heath |
| Lecanoraceae | <i>Lecanora bicincta</i> | Restricted | Northernmost | Volcanic rocks around summit and grassy frost pockets in sub-alpine Snow Gum woodland; restricted to Alpine areas |
| | <i>Lecanora farinacea</i> | Widespread | Westernmost | Weathered volcanic rocks around summit, woodland |
| | <i>Lecanora galactiniza</i> | Widespread | | Volcanic rocks and scree around summit, woodland |
| | <i>Lecanora oreinoides</i> | Widespread | | Weathered trachyte rocks, heathlands on W face of mountain |
| | <i>Lecanora pseudistera</i> | Widespread | | Volcanic rocks around summit and grassy frost pockets in sub-alpine Snow Gum woodland |
| | <i>Lecanora rupicola</i> | < Widespread | Northernmost | Rocky outcrops |

| | | | |
|--------------------|-------------------------------------------------------|------------|----------------------------------------------------------------------------------------|
| | <i>Lectidella stigmatea</i> | Widespread | Volcanic rocks around summit |
| | <i>Ramboldia petraeoides</i> | Widespread | Volcanic rocks around summit and dead tree trunks |
| | <i>Ramboldia sanguinolenta</i> | Widespread | Weathered rocks, woodlands on NW slopes of mountain, outlier recorded near Nimmitabel |
| | <i>Scoliosporium umbrinum</i> | Restricted | Northermost |
| | <i>Lecidea atrobrunnea</i> | Restricted | Northermost |
| Lecideaceae | <i>Lecidea capensis</i> | Widespread | Weathered rocks, heath and woodlands, W face of mountain |
| | <i>Lecidea ochroleuca</i> | Widespread | On rocks, NE forest slopes |
| Lobariaceae | <i>Pseudocyphellaria neglecta</i> | Widespread | Westernmost |
| Megalariaceae | <i>Megalaria montana</i> | Restricted | Endemic |
| Megasporaceae | <i>Aspicilia contorta</i> | Widespread | Easternmost |
| Mycosphaerellaceae | <i>Cercospora</i> sp. | Unknown | Summit and rock ledge, W slopes of mountain |
| | <i>Mycosphaerella</i> sp. | Unknown | Isolated from <i>Hardenbergia violaceae</i> |
| Pannariaceae | <i>Fuscopannaria submixta</i> | Widespread | Isolated from <i>Stypandra glauca</i> |
| | <i>Psoroma hypnorum</i> | Widespread | Soil over rocks, Federal Falls |
| Parmeliaceae | <i>Austroparmelina labrosa</i> | Widespread | Northermost |
| | <i>Austroparmelina pruinata</i> | Widespread | Westernmost |
| | <i>Austroparmelina pseudorelicina</i> | Widespread | On tree trunks and branches of shrubs, summit and W slopes |
| | <i>Flavoparmelia haysonii</i> | Widespread | Westernmost |
| | <i>Hypogymnia billardieri</i> | Widespread | On volcanic rocks, W face of mountain |
| | <i>Hypogymnia pulverata</i> | Widespread | On <i>Leptospermum</i> twigs |
| | <i>Hypogymnia subphysodes</i> var. <i>subphysodes</i> | Widespread | On dead wood, rocky heath and woodlands, W face of mountain |
| | <i>Notoparmelia signifera</i> | Widespread | On dead wood, woodlands, W face of mountain |
| | <i>Parmotrema reticulatum</i> | Widespread | On volcanic rocks, W face of mountain |
| | <i>Punctelia borrieri</i> | Widespread | On volcanic rocks, W face of mountain |
| | <i>Usnea inermis</i> | Widespread | On dead <i>Acacia</i> branch and bark, rocks in woodland |
| | <i>Xanthoparmelia atrocapnoides</i> | Widespread | Weathered rock, summit and woodlands on W slopes |
| | <i>Xanthoparmelia canobolasensis</i> | Restricted | On rocks, woodland NE slopes, only mainland record, elsewhere one location in Tasmania |

MOUNT CANOBOLAS BIODIVERSITY AND ENDEMISM

| | | | |
|--------------------------------------|------------|---|------------------------------------------------------------------------------------------|
| <i>Xanthoparmelia congesta</i> | Widespread | < | Weathered rock, summit and woodlands on W slopes |
| <i>Xanthoparmelia dichotoma</i> | Widespread | | On soil, NE woodlands; outliers at Tenterfield and Mt Cordeaux Qld. |
| <i>Xanthoparmelia digitiformis</i> | Widespread | < | Shaded rocky face, summit areas, Snow Gum woodland |
| <i>Xanthoparmelia elixii</i> | Widespread | | Exposed rocky outcrops and stunted forests |
| <i>Xanthoparmelia flavescens</i> | Widespread | | Weathered rock, The Walls, summit areas and woodlands on W slopes |
| <i>Xanthoparmelia furcata</i> | Widespread | | Rock outcrops, The Walls |
| <i>Xanthoparmelia loxodella</i> | Widespread | | Volcanic rocks summit and grassy frost pockets in sub-alpine Snow Gum woodland, W slopes |
| <i>Xanthoparmelia metachystoides</i> | Widespread | | Weathered rock, NW slopes |
| <i>Xanthoparmelia metamorphosa</i> | Widespread | < | On soil and pebbles, The Walls woodland |
| <i>Xanthoparmelia metastrigosa</i> | Restricted | | Weathered rock and soil, summit and woodlands NE slopes |
| <i>Xanthoparmelia mexicana</i> | Widespread | < | Dead tree trunk among rock outcrops |
| <i>Xanthoparmelia multipartita</i> | Restricted | | Recorded as a component of Mt Canobolas |
| <i>Xanthoparmelia neorimalis</i> | Widespread | | <i>Xanthoparmelia</i> Endangered Ecological Community |
| <i>Xanthoparmelia oleosa</i> | Widespread | | Recorded as a component of Mt Canobolas |
| <i>Xanthoparmelia parviloba</i> | Widespread | < | <i>Xanthoparmelia</i> Endangered Ecological Community |
| <i>Xanthoparmelia pulla</i> | Widespread | | Weathered rocks, summit woodlands |
| <i>Xanthoparmelia scabrosa</i> | Widespread | | On rock, summit woodlands |
| <i>Xanthoparmelia semiviridis</i> | Widespread | < | Rock outcrop N slope from summit, Snow Gum woodland |
| <i>Xanthoparmelia substrigosa</i> | Widespread | < | On soil, summit woodlands |
| <i>Xanthoparmelia sulcifera</i> | Restricted | | On soil and pebbles, The Walls woodland |
| | | | On soil and pebbles, grasslands around summit, restricted to SE mainland |
| <i>Xanthoparmelia willsii</i> | Widespread | < | On soil, grasslands around summit; outliers in Tasmania |
| Pertusariaceae | | | |
| <i>Pertusaria lophocarpa</i> | Widespread | | Weathered rock, summit area woodlands |
| Physciaceae | | | |
| <i>Buellia aethalia</i> | Widespread | | Summit area |
| <i>Buellia canobolasensis</i> | Restricted | | Known only from the summit area and another mountain top in the ACT |
| <i>Buellia homophylla</i> | Widespread | | Volcanic rock, summit area woodlands |
| <i>Buellia mafficola</i> | Widespread | | Type specimen from summit area |
| <i>Buellia ocellata</i> | Restricted | | Volcanic rock, summit area woodlands; restricted to SE Australia |
| <i>Physcia adscendens</i> | Widespread | | Shaded rocks, but usually on wood; outliers at Guyra and Lamington NP |

| | | | |
|---------------------------------|--------------|--------------|---------------------------------------------------------------------------------------------------------|
| <i>Physcia austrocaesia</i> | Widespread | Northernmost | Dead twigs, woodlands W face; outlier on rock at Stianthorpe |
| <i>Physcia jackii</i> | Widespread | | On dead <i>Acacia</i> , summit and W slopes |
| <i>Physcia poncinsii</i> | Widespread | Westernmost | Volcanic rock, summit area woodlands |
| <i>Parapropidia leptocarpa</i> | Widespread | | Amongst rock outcrops in stunted woodlands |
| <i>Pyronemataceae</i> | < Widespread | | |
| <i>Rhizocarpon distinctum</i> | Restricted | Northernmost | Weathered rock, heathlands on W face; restricted to SE Australia |
| <i>Rhizocarpon geminatum</i> | Restricted | Northernmost | Weathered rock, heathlands on W face; restricted to SE Australia |
| <i>Rhizocarpon geographicum</i> | Widespread | | On rock, summit and woodlands on W slopes |
| <i>Rhizocarpon reductum</i> | < Widespread | | On rock, summit and woodlands on W slopes |
| <i>Stereocaulon corticatum</i> | Widespread | Northernmost | On rock amongst other lichens; outliers at Barrington Tops and Point Lookout |
| <i>Teloschistaceae</i> | < Widespread | Rare in NSW | Summit, on scree NW slopes |
| <i>Caloplaca crenulatella</i> | Widespread | | Rock outcrops around summit |
| <i>Caloplaca rexifilisonii</i> | Widespread | | Rock outcrops around summit |
| <i>Caloplaca rubelliana</i> | Widespread | | Volcanic rocks around summit and grassy frost pockets in sub-alpine Snow Gum woodland |
| <i>Diploschistes scruposus</i> | Widespread | | |
| <i>Diploschistes sticticus</i> | Widespread | | On rock, summit and woodlands on W slopes |
| <i>Ingvarella bispora</i> | Restricted | Northernmost | On rock, summit and heath on W slopes; restricted to SE Australia |
| <i>Placopsis perrugosa</i> | Widespread | Northernmost | Shaded rock, woodlands W face; outliers at Barrington Tops and Ingham Qld |
| <i>Rimularia insularis</i> | Restricted | Northernmost | On rock, open woodland; restricted to SE mainland |
| Phylum | | | |
| <i>Basidiomycota</i> | | | |
| <i>Phragmidaceae</i> | Widespread | Northernmost | Isolated from blackberry |
| <i>Pileolariaceae</i> | Unknown | Northernmost | Isolated from <i>Acacia melanoxylon</i> . Only known record for NSW; also recorded for ACT, Vic. and NZ |
| <i>Pucciniaceae</i> | < Widespread | | Isolated from <i>Senecio quadridentatus</i> . |
| <i>Raveneliaceae</i> | Unknown | | Isolated from a <i>Daviesia</i> sp. |
| <i>Russulaceae</i> | Widespread | Westernmost | Grassy woodland, Orange View |
| <i>Cystangium sessile</i> | Widespread | Westernmost | Grassy woodland, Orange View |
| <i>Cystangium shultzeae</i> | < Widespread | Northernmost | Grassy woodland, Orange View |
| <i>Ustilago comburens</i> | Widespread | Northernmost | Only known record for NSW; also recorded for ACT, Vic, WA and NZ |

Appendix 4. Vertebrates recorded for Mt Canobolas State Conservation Area (ALA and other database sources 2018) (*exotic species).

| Order | Family | Scientific name | Common name | Regional distribution | Range limit |
|-------------------------|-------------------|------------------------------------------|------------------------------|-----------------------|-------------|
| ACTINOPTERYGII | | | | | |
| Salmoniformes | Galaxiidae | <i>Galaxias olidus</i> | Inland or Mountain Galaxia | Widespread | |
| AMPHIBIA | | | | | |
| Anura | Hylidae | <i>Litoria verreauxii</i> | Whistling Tree Frog | Widespread | |
| | Limnodynastidae | <i>Limnodynastes dumerilii dumerilii</i> | Eastern Banjo Frog | Widespread | |
| | Myobatrachidae | <i>Crinia parinsignifera</i> | Eastern Sign-bearing Froglet | Widespread | |
| | | <i>Crinia signifera</i> | Common Froglet | Widespread | |
| | | <i>Uperoleia laevigata</i> | Smooth Toadlet | Widespread | |
| AVES | | | | | |
| Anseriformes | Anatidae | <i>Anas gracilis</i> | Grey Teal | Widespread | |
| | | <i>Anas superciliosa</i> | Pacific Black Duck | Widespread | |
| | | <i>Aythya australis</i> | White-eyed Duck, Hardhead | Widespread | |
| | | <i>Chenonetta jubata</i> | Australian Wood Duck | Widespread | |
| Caprimulgiformes | Podargidae | <i>Podargus strigoides</i> | Tawny Frogmouth | Widespread | |
| Ciconiiformes | Ardeidae | <i>Egretta novaehollandiae</i> | White-faced Heron | Widespread | |
| | Threskiornithidae | <i>Threskiornis spinicollis</i> | Straw-necked Ibis | Widespread | |
| Columbiformes | Columbidae | <i>Phaps chalcoptera</i> | Common Bronzewing | Widespread | |
| Coraciiformes | Coraciidae | <i>Eurystomus orientalis</i> | Dollarbird | Widespread | |
| | Halcyonidae | <i>Dacelo novaeguineae</i> | Laughing Kookaburra | Widespread | |
| | | <i>Todiramphus sanctus</i> | Sacred Kingfisher | Widespread | |
| Cuculiformes | Cuculidae | <i>Cacomantis flabelliformis</i> | Fan-tailed Cuckoo | Widespread | |
| | | <i>Cacomantis pallidus</i> | Pallid Cuckoo | Widespread | |
| | | <i>Chalcites osculans</i> | Black-eared Cuckoo | Widespread | |
| | | <i>Chrysococcyx basalis</i> | Horsfield's Bronze-cuckoo | Widespread | |
| | | <i>Chrysococcyx lucidus</i> | Shining Bronze-cuckoo | Widespread | |
| | | <i>Eudynamys orientalis</i> | Common Koel, Pacific Koel | Widespread | |
| Falconiformes | Accipitridae | <i>Accipiter cirrocephalus</i> | Collared Sparrowhawk | Widespread | |
| | | <i>Accipiter fasciatus</i> | Brown Goshawk | Widespread | |

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|----------------------|--------------------------------------|----------------------------|------------|
| | <i>Aquila audax</i> | Wedge-tailed Eagle | Widespread |
| | <i>Hieraaetus morphnoides</i> | Little Eagle | Widespread |
| Falconidae | <i>Falco berigora</i> | Brown Falcon | Widespread |
| | <i>Falco cenchroides</i> | Nankeen Kestrel | Widespread |
| Gruiformes | <i>Falco peregrinus</i> | Peregrine Falcon | Widespread |
| | <i>Fulica atra</i> | Eurasian Coot | Widespread |
| | <i>Gallinula tenebrosa tenebrosa</i> | Dusky Moorhen | Widespread |
| Passeriformes | <i>Acanthiza chrysoorhoa</i> | Yellow-rumped Thornbill | Widespread |
| | <i>Acanthiza lineata</i> | Striated Thornbill | Widespread |
| | <i>Acanthiza nana</i> | Yellow Thornbill | Widespread |
| | <i>Acanthiza pusilla</i> | Brown Thornbill | Widespread |
| | <i>Acanthiza reguloides</i> | Buff-rumped Thornbill | Widespread |
| | <i>Acanthiza uropygialis</i> | Chestnut-rumped Thornbill | Widespread |
| | <i>Gerygone fusca</i> | Western Gerygone | Widespread |
| | <i>Gerygone olivacea</i> | White-throated Gerygone | Widespread |
| | <i>Sericornis frontalis</i> | White-browed Scrubwren | Widespread |
| | <i>Smicromis brevirostris</i> | Weebill | Widespread |
| Artamidae | <i>Artamus cyanopterus</i> | Dusky Woodswallow | Widespread |
| | <i>Artamus superciliosus</i> | White-browed Woodswallow | Widespread |
| | <i>Cracticus nigrogularis</i> | Pied Butcherbird | Widespread |
| | <i>Cracticus tibicen</i> | Australian Magpie | Widespread |
| | <i>Cracticus torquatus</i> | Grey Butcherbird | Widespread |
| | <i>Strepera graculina</i> | Pied Currawong | Widespread |
| | <i>Strepera versicolor</i> | Grey Currawong | Widespread |
| Campephagidae | <i>Coracina novaehollandiae</i> | Black-faced Cuckoo-Shrike | Widespread |
| Climacteridae | <i>Climacteris erythrops</i> | Red-browed Treecreeper | Widespread |
| | <i>Cormobates leucophaea</i> | White-throated Treecreeper | Widespread |
| Corcoracidae | <i>Corcorax melanorhamphos</i> | White-winged Chough | Widespread |
| Corvidae | <i>Corvus coronoides coronoides</i> | Australian Raven | Widespread |
| | <i>Corvus mellori</i> | Little Raven | Widespread |

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| | | | |
|-----------------|----------------------------------------|--------------------------|------------|
| Dicaeidae | <i>Dicaeum hirundinaceum</i> | Mistletoebird | Widespread |
| Dicruridae | <i>Grallina cyanoleuca</i> | Maggie-lark | Widespread |
| | <i>Myiagra cyanolenca</i> | Satin Flycatcher | Widespread |
| | <i>Myiagra inquieta</i> | Restless Flycatcher | Widespread |
| | <i>Myiagra rubecula</i> | Leadon Flycatcher | Widespread |
| | <i>Rhipidura albiscapa alisteri</i> | Grey Fantail | Widespread |
| | <i>Rhipidura leucophrys</i> | Willie Wagtail | Widespread |
| | <i>Rhipidura rufifrons</i> | Rufous Fantail | Widespread |
| Estrildidae | <i>Neochmia temporalis</i> | Red-browed Finch | Widespread |
| Hirundinidae | <i>Petrochelidon nigricans</i> | Tree Martin | Widespread |
| Maluridae | <i>Malurus cyaneus</i> | Superb Fairy-wren | Widespread |
| Meliphagidae | <i>Acanthagenys rufogularis</i> | Spiny-cheeked Honeyeater | Widespread |
| | <i>Acanthorhynchus tenuirostris</i> | Eastern Spinebill | Widespread |
| | <i>Anthochaera carunculata</i> | Red Wattlebird | Widespread |
| | <i>Caligavis chrysops</i> | Yellow-faced Honeyeater | Widespread |
| | <i>Certhionyx variegatus</i> | Pied Honeyeater | Widespread |
| | <i>Entomyzon cyanotis</i> | Blue-faced Honeyeater | Widespread |
| | <i>Manorina melanocephala</i> | Noisy Miner | Widespread |
| | <i>Melithreptus lunatus</i> | White-naped Honeyeater | Widespread |
| | <i>Nesoptilotis leucotis</i> | White-eared Honeyeater | Widespread |
| | <i>Philemon citreogularis</i> | Little Friarbird | Widespread |
| | <i>Philemon corniculatus</i> | Noisy Friarbird | Widespread |
| | <i>Ptilonula penicillata</i> | White-plumed Honeyeater | Widespread |
| Motacillidae | <i>Anthus novaeseelandiae</i> | Australian Pipit | Widespread |
| Neositidae | <i>Daphoenositta chrysoptera</i> | Varied Sittella | Widespread |
| Oriolidae | <i>Oriolus sagittatus</i> | Olive-Backed Oriole | Widespread |
| Pachycephalidae | <i>Colluricincla harmonica</i> | Grey Shrike-Thrush | Widespread |
| | <i>Falcunculus frontatus frontatus</i> | Eastern Shrike-tit | Widespread |
| | <i>Pachycephala pectoralis</i> | Golden Whistler | Widespread |
| | <i>Pachycephala rufiventris</i> | Rufous Whistler | Widespread |

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|-----------------------|----------------|--------------------------------------------|--------------------------------|---------------------------------------------|
| | Pardalotinae | <i>Pardalotus punctatus</i> | Spotted Pardalote | Widespread |
| | | <i>Pardalotus striatus</i> | Striated Pardalote | Widespread |
| | Petroicidae | <i>Eopsaltria australis</i> | Eastern Yellow Robin | Widespread |
| | | <i>Petroica boodang</i> | Scarlet Robin | Widespread |
| | | <i>Petroica goodenovii</i> | Red-capped Robin | Widespread |
| | | <i>Petroica phoenicea</i> | Flame Robin | Widespread |
| | | <i>Petroica rosea</i> | Rose Robin | Widespread |
| | Sturnidae | * <i>Sturnus vulgaris</i> | Common Starling | Widespread |
| | Turdidae | * <i>Turdus merula</i> | Common Blackbird | Widespread |
| | Zosteropidae | <i>Zosterops lateralis</i> | Silvereye | Widespread |
| Psittaciformes | Cacatuidae | <i>Cacatua galerita</i> | Sulphur-crested Cockatoo | Widespread |
| | | <i>Calyptorhynchus funereus</i> | Yellow-tailed Black-cockatoo | Widespread |
| | | <i>Eolophus roseicapillus</i> | Galah | Widespread |
| | Psittacidae | <i>Alisterus scapularis</i> | Australian King-Parrot | Widespread |
| | | <i>Glossopsitta concinna</i> | Musk Lorikeet | Widespread |
| | | <i>Neophema pulchella</i> | Turquoise Parrot | Widespread |
| | | <i>Platyercus elegans</i> | Crimson Rosella | Widespread |
| | | <i>Platyercus eximius</i> | Eastern Rosella | Widespread |
| Strigiformes | Strigidae | <i>Ninox novaeseelandiae</i> | Southern Boobook, Morepork | Widespread |
| | | <i>Ninox (Rhabdoglaux) strenua</i> | Powerful Owl | Widespread |
| MAMMALIA | | | | |
| Artiodactyla | Bovidae | * <i>Capra hircus</i> | Goat | Widespread |
| | Cervidae | * <i>Cervus elaphus</i> | Red Deer | Widespread |
| | Suidae | * <i>Sus scrofa</i> | Pig | Widespread |
| Carnivora | Canidae | * <i>Canis lupus familiaris</i> | Dog | Widespread |
| | | * <i>Vulpes vulpes</i> | Red Fox | Widespread |
| Chiroptera | Emballonuridae | <i>Saccolaimus flaviventris</i> | Yellow-bellied Sheath-tail-bat | Widespread |
| | Miniopteridae | <i>Miniopterus schreibersii oceanensis</i> | Eastern Bent-wing Bat | Widespread |
| | | | | Westernmost [outliers Balranald & Narrabri] |

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|-----------------------|------------------|----------------------------------------|-----------------------------|------------|--------------|
| | Molossidae | <i>Austronomus australis</i> | White-striped Freetail-bat | Widespread | |
| | | <i>Mormopterus (Ozimops) planiceps</i> | Little Mastiff-bat | Widespread | |
| | | <i>Mormopterus (Ozimops) ridei</i> | Ride's Free-tailed Bat | Widespread | |
| | Vespertilionidae | <i>Chalinolobus gouldii</i> | Gould's Wattled Bat | Widespread | |
| | | <i>Chalinolobus morio</i> | Chocolate Wattled Bat | Widespread | |
| | | <i>Falsistrellus tasmaniensis</i> | Eastern False Pipistrelle | Widespread | |
| | | <i>Nyctophilus geoffroyi geoffroyi</i> | Lesser Long-eared Bat | Widespread | |
| | | <i>Scotorepens orion</i> | Eastern Broad-nosed Bat | Widespread | |
| | | <i>Vespadelus darlingtoni</i> | Large Forest Bat | Widespread | |
| | | <i>Vespadelus regulus</i> | Southern Forest Bat | Widespread | |
| | | <i>Vespadelus vulturinus</i> | Little Forest Bat | Widespread | |
| Dasyuromorphia | Dasyuridae | <i>Antechinus agilis</i> | Agile Antechinus | Widespread | Northernmost |
| | | <i>Antechinus stuartii</i> | Brown Antechinus | Widespread | Westernmost |
| Diprotodontia | Acrobatidae | <i>Acrobates pygmaeus</i> | Feathertail Glider | Widespread | |
| | Macropodidae | <i>Macropus giganteus</i> | Eastern Grey Kangaroo | Widespread | |
| | | <i>Macropus rufogriseus</i> | Red-necked Wallaby | Widespread | |
| | | <i>Osphranter robustus robustus</i> | Walleroo | Widespread | |
| | | <i>Wallabia bicolor</i> | Swamp Wallaby | Widespread | |
| | Petauridae | <i>Petaurus australis</i> | Yellow-bellied Glider | Widespread | Westernmost |
| | | <i>Petaurus breviceps breviceps</i> | Sugar Glider | Widespread | |
| | Phalangeridae | <i>Trichosurus vulpecula</i> | Australian Brushtail Possum | Widespread | |
| | Pseudocheiridae | <i>Petauroides volans</i> | Greater Glider | Widespread | Westernmost |
| | | <i>Pseudocheirus peregrinus</i> | Common Ringtail Possum | Widespread | |
| | Vombatidae | <i>Vombatus ursinus</i> | Bare-nosed Wombat | Widespread | |
| Lagomorpha | Leporidae | * <i>Oryctolagus cuniculus</i> | Rabbit | Widespread | |
| Monotremata | Tachyglossidae | <i>Tachyglossus aculeatus</i> | Short-beaked Echidna | Widespread | |
| Perissodactyla | Equidae | * <i>Equus caballus</i> | Horse | Widespread | |

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|-----------------|-----------|-----------------------------------|------------------------------|------------|-------------|
| Rodentia | Muridae | <i>*Mus musculus</i> | House Mouse | Widespread | |
| | | <i>Rattus fuscipes</i> | Southern Bush Rat | Widespread | |
| | | <i>*Rattus rattus</i> | Ship Rat | Widespread | |
| REPTILIA | | | | | |
| Squamata | Agamidae | <i>Amphibolurus muricatus</i> | Jacky Lizard | Widespread | |
| | | <i>Rankinia diemensis</i> | Mountain Dragon | Widespread | Westernmost |
| | Elapidae | <i>Austrelaps ramsayi</i> | Highland Copperhead | Widespread | Westernmost |
| | Scincidae | <i>Acritoscincus platynotus</i> | Red-throated Skink | Widespread | |
| | | <i>Ctenotus robustus</i> | Robust Ctenotus | Widespread | |
| | | <i>Ctenotus taeniolatus</i> | Copper-tailed Skink | Widespread | |
| | | <i>Egernia cunninghami</i> | Cunningham's Skink | Widespread | |
| | | <i>Egernia striolata</i> | Tree Skink | Widespread | |
| | | <i>Eulamprus heatwolei</i> | Yellow-bellied Water Skink | Widespread | Westernmost |
| | | <i>Eulamprus quoyii</i> | Eastern Water-skink | Widespread | |
| | | <i>Hemiergis decresiensis</i> | Three-toed Earless Skink | Widespread | |
| | | <i>Lampropholis delicata</i> | Dark-flecked Garden Skink | Widespread | |
| | | <i>Lampropholis guichenoti</i> | Pale-flecked Garden Sunskink | Widespread | |
| | | <i>Liopholis whitii</i> | White's Skink | Widespread | |
| | | <i>Menetia greyii</i> | Common Dwarf Skink | Widespread | |
| | | <i>Pseudemoia entrecasteauxii</i> | Tussock Cool-skink | Widespread | Westernmost |
| | | <i>Saproscincus mustelinus</i> | Weasel Skink | Widespread | Westernmost |
| | | <i>Tiliqua rugosa</i> | Shingle-back | Widespread | |
| | | <i>Tiliqua scincoides</i> | Eastern Blue-tongue | Widespread | |
| | Varanidae | <i>Varanus gouldii</i> | Gould's Goanna | Widespread | |